Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES

Vol. XIV.—No. 8. (NEW SERIES.) | NEW YORK, FEBRUARY 17, 1866. | $3 PER ANNUM IN ADVANCE.

The Art of Preserving Wood.

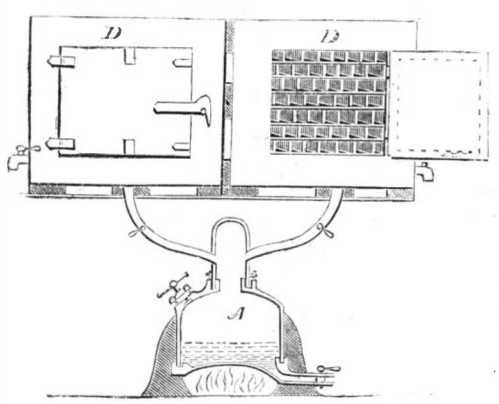
Wood is an article of prime necessity and stands foremost in its connection with every conceivable interest within the range of civilization. Millions of men and unlimited capital are daily employed in converting wood and lumber to the innumerable and necessary uses required for human comfort. So great is the demand for lumber in the progress of the arts and civilization, that our native forests, which so recently covered nearly the whole of the Eastern and Middle States have been brought into requisition and removed, except small portions at great distances from market or situated in almost inaccessible localities. The increase of our population and the improvements in the arts, generally, have been so rapid, that even now it is a serious problem as to where we are to obtain our future supply of wood and lumber.

Notwithstanding wood is so intimately and extensively connected with all the various interests of human progress, and the vast and unlimited means devoted to its conversion from its condition in the forest to its ultimate uses, it cannot have escaped, even the most casual observer, that it is, nevertheless, an article subject to rapid and useless decay. It is a no less-important fact that wood occupies a place that cannot be supplied by all the other resources of nature aided by human invention.

It now becomes a matter for serious inquiry whether we cannot accelerate the growth of wood or preserve it from decay. Indeed, this has long been a subject of most earnest inquiry and deep concern in countries of an older civilization than our own; and within the last thirty years the inventive genius of man has been taxed to devise means by which so desirable a result could be obtained as the preservation of wood. In view of the immense expenditure of time and capital, devoted to fashioning and adapting wood to the various forms and uses required, it is obvious that no greater achievement can be made in the useful arts than the effectual preservation of wood from decay, and the saving of the vast annual expenditure required in removing the things which the elements have destroyed, and in supplying new materials and structures in their place.

Out of the great number of inventions and patents made and obtained for this purpose, one invention—that for which Bethell obtained Letters Patent in England, in 1838—has demonstrated the fact, that by the use of oleaginous compounds, obtained from the distillation of coal tar, properly applied, wood can be preserved for an indefinite length of time.

The following-named inventions and patents, made



and granted in Europe, are referred to for the purpose of showing some of the means which have been resorted to—without substantial success—to obtain this desireable result; and also to afford such information to the public as will guard it against any expenditure of means with a view to the introduction of such processes in this country.

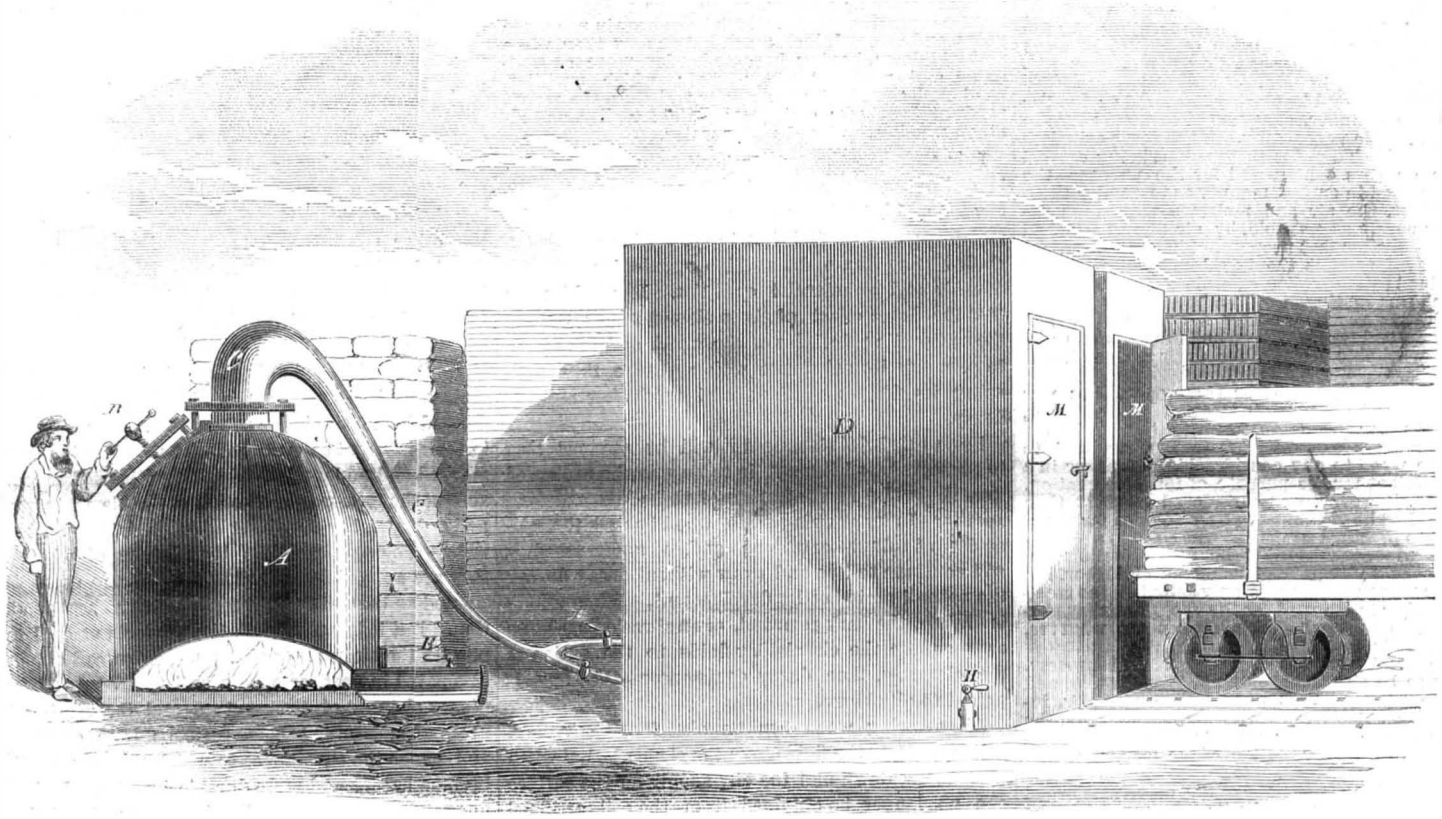
Kyan's process for preserving wood was the first to attract general attention. It was introduced in 1832, and subsequently patented in this country. The process consists in saturating the wood with a dilute solution of corrosive sublimate. This method, always too expensive to admit of general application, has been wholly abandoned in this country.

In 1837, one Margary obtained a patent in England for preserving timber by immersing it in a solution of acetate or sulphate of copper. After being thoroughly tested in England this process has gradualy yielded to other processes.

In 1838, Sir William Burnett's process was patented, and since that time Burnettizing wood has been practiced in Europe and America. In this process the wood is saturated with a concentrated solution of the chloride of zinc. While Kyan's discovery failed of being widely adopted, from the fact that the material employed was too expensive to admit of being generally used, Burnett's process, for a similar reason, has only been employed to a limited extent.

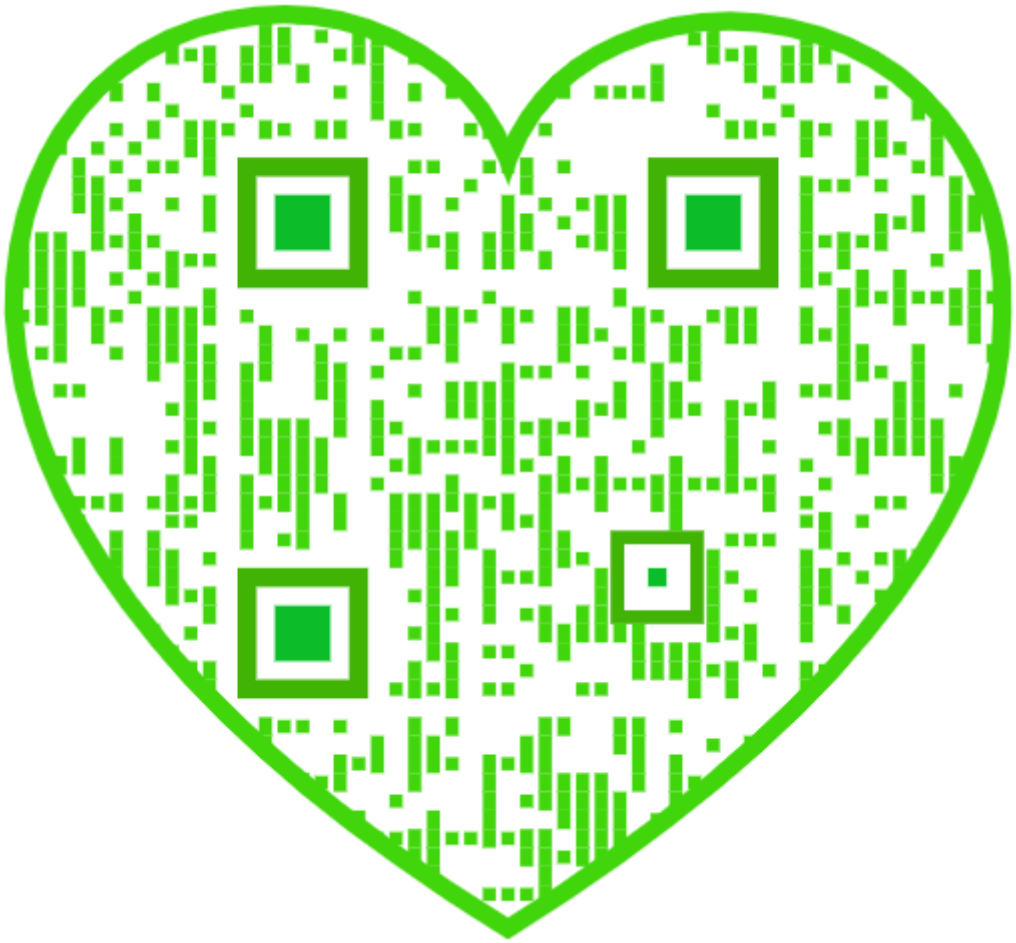
Payne's process was patented in England in 1841. He employed two solutions, successively, which naturally decomposed each other, forming an insoluble substance in the pores of the wood. The earthy or metallic solution is first introduced into the timber, under pressure; after which the solution is drawn off and the decomposing fluid forced in. Sulphate of iron and carbonate of soda are said to form the insoluble compound in the pores of the wood. This process has been tried in England and this country, and has met with some favor in France.

Dr. Boucherie, a distinguished French chemist, invented a process for preserving wood, and for which he procured a patent. It is claimed that this process accomplishes two objects:—First, it expels the sap; and, secondly, it fills the pores of the timber with a preservative solution. The fluid that is alleged to preserve the wood is so introduced by pressure that it "passes longitudinally along the fibers," thus expelling the sap and occupying its place. The claims of this process are being urged in this country under the false pretense that it is a new discovery.



ROBBINS'S APPARATUS FOR PRESERVING WOOD.

© 1866 SCIENTIFIC AMERICAN, INC.



Bethell—by his process patented in England in 1838—rendered wood more imperishable by the use of a cheaper material; but his machinery was unnecessarily complicated, and his method of conducting the process quite imperfect and too expensive to admit of general application. We extract the following partial description of Bethell's process from a small treatise on the art of preserving wood, published in this country in 1859:—

It consists in impregnating the timber with an oily matter obtained from a rough distillation from coal tar. This oily matter contains a variety of substances, having different chemical properties; one of the essential ingredients for this purpose is said to be creosote, which forms, as estimated, about thirty per cent of the product of distillation used for this purpose. The other ingredients have a no less important effect. The oily matter is injected into the timber by pressure in closed vessels, from which the air is first partially exhausted.

The subjoined letter from Dr. Dwinelle, who personally witnessed what he describes, is sufficiently explicit, in respect to Bethell's machinery and process.

LOUIS S. ROBBINS—*Dear Sir:* I cheerfully comply with your request to give you such information as I obtained in Europe, several years ago, in regard to the use of *coal tar* and its products as a means of preserving wood.

In 1852, while investigating different matters of public interest in London, I was invited by Mr. Burt to visit his extensive works on the Surrey side of the Thames, where he had, for several years, been treating—for the English and India markets—large quantities of wood with products of coal tar, according to a process patented by Mr. Bethell in 1838.

His process consisted in placing the wood or lumber in a large iron cylinder, constructed expressly for the purpose, and made very strong. When these cylinders were sufficiently charged with wood—it being carried into them on cars constructed for the purpose—the ends were closed in such a manner as to render them perfectly tight, the air and moisture were then exhausted, as nearly as possible, by air pumps attached to the apparatus for that purpose. Then other pumps were employed to force the liquid product, that had been obtained by distillation of coal tar, into the cylinders, which was continued until a pressure of 150 lbs. to the inch was reached. After a certain time had elapsed, the wood was taken out of the cylinders and placed in a suitable position for drying, when it was ready for use.

The machinery employed for these operations was both complicated and expensive, and so imperfect, in respect to its capacity to produce the result desired, that a large amount of time was required to saturate the wood to any considerable extent, or in a degree sufficient for the purpose of its preservation. This method, however, was considered the best then known, and had been proved to be a success for many years, by the practical use of the wood thus treated.

Bethell's process seemed to be very objectionable, not only because it required much time and labor, but also for the reason that it was only suited to the treatment of lumber to be used for the most ordinary purposes, such as railroad sleepers, piles for wharves, bridges, etc., etc.

I have carefully examined your patented process. It appears to be simple, rapid and inexpensive, and much more perfect in its results than Bethell's, inasmuch as the hot oleaginous vapors arising from the distillation of the coal tar must, under the circumstances, permeate every portion of the wood or lumber to any extent required.

Your process is open to none of the objections urged against Bethell's plan, since, by its use, wood may be rapidly and properly treated for all the various uses to which wood is applied in the mechanic arts. Moreover, the fact that you use the same material leaves no doubt as to the success of your patent, it having long since been practically established in Europe, that the products obtained from the distillation of coal tar, if properly applied to wood, will preserve it for a great length of time from decay, and also from destruction by marine and other insects. Truly yours,

WM. H. DWINELLE, M. D.,
No. 119 Tenth Street, New York.

The great value of Bethell's discovery has been so clearly demonstrated, by the uniform results of its application, that scientific men in Europe, and especially the most distinguished engineers in England, have come to entertain but one opinion of its merits. It can hardly be necessary to multiply authorities in this connection, since the following emphatic testimony—extracted from Dr. Andrew Ure's "Dictionary of the Arts," must satisfy the most skeptical reader. Treating of the results of Bethell's process he says:—

The effect produced is that of perfectly coagulating the albumen in the sap, thus preventing its putrefaction. For the wood that will be much exposed to the weather, and alternately wet and dry, the mere coagulation of the sap is not sufficient; for although the albumen contained in the sap of the wood is the most liable and the first to putrify, yet the ligneous fiber itself, after it has been deprived of all sap, will, when exposed in a warm damp situation, rot and crumble into dust. To preserve wood, therefore, that will be much exposed to the weather it is not only necessary that the sap should be coagulated, but that the fibers should be protected from moisture, which is effectually done by this process.

The atmospheric action on wood thus prepared, renders it tougher, and infinitely stronger. A post made of beech, or even of Scotch fir, is rendered more durable, and as strong as one made of the best oak, the bituminous mixture with which all its pores are filled acting as a cement to bind the fibers together in a close tough mass; and the more porous the wood is, the more durable and tough it becomes, as it imbibes a greater quantity of the bituminous oil, which is proved by its increased weight. The materials which are injected preserve iron and other metals from corrosion; and an iron bolt driven into wood so saturated, remains perfectly sound and free from rust. It also resists the attack of insects; and it has been proved by Mr. Pritchard, at Shoreham Harbor, that the *teredo navalis*, or naval worm, will not touch it.

Wood thus prepared for sleepers, piles, posts, fencing, etc., is not at all affected by alternate exposure to wet and dry; it requires no painting, and after it has been exposed to the air for some days, it loses every unpleasant smell.

This process has been adopted by the following eminent engineers, viz.: Mr. Robert Stephenson. Mr. Brunel, Mr. Bidder, Mr. Brathwaite, Mr. Buck, Mr Harris, Mr. Wickstead, Mr. Pritchard, and others; and has been used with the greatest success on the Great Western Railway, the Bristol and Exeter Railway, the Manchester and Birmingham Railway, the North Eastern, the South Eastern, the Stockton and Darlington, and at Shoreham Harbor; and lately, in consequence of the excellent appearance of the prepared sleepers, after three years' exposure to the weather, an order has been issued by Mr. Robert Stephenson that the sleepers hereafter to be used on the London and Birmingham Railway are to be prepared with it before being put down.

. . . . . .

For railway sleepers it is highly useful, as the commonest Scotch fir sleeper, when thus prepared, will last for centuries. Those which have been in use three years and upward, look much better now than when first laid down, having become harder, more consolidated and perfectly water-proof; which qualities, combined with that of perfectly resisting the worm, render this process eminently useful for piles, and all other woodwork placed under water.

It is stated by the best authorities, and confirmed by ordinary experience and observation, that the decay of wood is due to the action of oxygen and moisture; and we find that in proportion as it is excluded from these destructive agents it retains its durable and substantial qualities. It would seem that the direct effect of these elements is to remove the antiseptic principles of the wood, and afterward to permeate its substance with moisture, thus softening its fibrous portions and producing mold or decay.

From this brief statement it will be obvious that to preserve wood it must, in some way, be protected from the action and influence of these decomposing agents. In its growing state, wood has all the elements of self-preservation; and, if undisturbed, it will continue to live and grow without decay during the natural period of its development. When a limb is broken, the bark removed, or an abrasion made, so as to expose the circulating fluids to the action of the elements, then decay commences—this fact is patent to all observers.

All growing wood has an oleaginous covering, which protects the fluids from the elements, but when wood is cut down and the oily supply for the surface can no longer be obtained from the soil, artificial means must then be employed that will fully protect the wood from the influence of oxygen and moisture. Oleaginous compounds, such as are obtained from the distillation of coal tar and similar substances, are adapted to this purpose; and they can be applied to wood in such a manner as to preserve it for an indefinite period. This is what is accomplished by Mr. Robbins's patented process hereinafter described. The oily products obtained from the distillation of bituminous substances are not decomposed and destroyed by the action of oxygen and moisture at ordinary temperatures. Hence, when they are properly applied to wood they must protect and preserve it.

It appears to have been the leading idea with all the European inventors, if we except Bethell, to deprive wood of some of its important constituents and essential properties, or to otherwise change them by chemical action. In this, they not only disregarded the common experience of all ages, but they were at war with Nature. The common mistake among them consisted in attempting to produce a condition of wood that is wholly unlike its living state, instead of restoring to it what had been lost by time and exposure to the elements. Moreover, while the materials used actually destroyed the native integrity of the wood, they were of far too costly a nature to admit of general application. For these reasons the several processes of Kyan, Margary, Burnett, Payne and Boucherie, will ultimately be regarded as failures, practically and in every essential sense.

Very different will be the public verdict respecting the claims of Bethell's discovery. How far he really comprehended, or even perceived the principles which the subject involves, we may not be able to determine; nor is this important in estimating the value of what he accomplished. It is manifest that his course of experiment was in the right direction. He sought to preserve, by artificial means, the vitality of Nature—to prevent the loss of those constituents and properties which are essential to wood in its normal and undecaying state. To him belongs the credit of originality, and of furnishing the potent suggestion which has enabled Mr. Robbins to complete a discovery second to no achievement in the useful arts, in the universality of its application, and in the consequent magnitude of its practical results.

Hitherto we have discovered nothing that will so effectually resist moisture as oil. It is not only a demonstrated fact in science, but it has become a proverb everywhere, that oil and water have no affinity—that they will not unite. While water finds its way through the closest animal tissues and into the hardest wood, and, by mechanical pressure, may even be forced through the solid metals, this antagonism between oil and water is universal and irresistible. This suggests the immense value of oil in preparation of all durable fabrics and manufactures of wood that are required to be impervious to moisture. In all civilized countries, and back through the entire historic period of the world, men have acted on this suggestion; in the preparation of the skins of animals, for shoes and for other purposes; in the manufacture of various outside garments; in painting their dwellings, ships, fences, furniture, and all the other superstructures of wood. These are rendered durable by the proper application of oil, and in proportion as the oil so applied is of a nature suited to endure the action and influence of oxygen and moisture.

The vegetable and animal oils differ essentially in their constituents from the oleaginous compounds derived from bituminous substances. The difference in their inherent capacity to resist moisture is equally marked and no less deserving of notice. The exposure of the former to the action of the elements gradually diminishes this power of resistance. Heat brings the organic oils to the surface of whatever they are applied to, and some of them are soon dissipated so that they no longer afford a sure protection. But it is not so with the products of coal tar, or with the bituminous oils. These, instead of being dissipated in part, or otherwise impaired by the ordinary changes of temperature and the varying degrees of moisture, become resinous from exposure; and hence the substances to which they are applied become harder and more durable by time. It is the unqualified testimony of Dr. Ure that railroad sleepers, that had been in use for more than three years, "looked much better than when first laid down."

At the time we write corrosive sublimate is worth one hundred and thirty-five dollars per one hundred pounds, while chloride of zinc is still more expensive. The preparation of railroad ties, by the use of such materials, would cost some four or five dollars each, while the cost of a far more effectual treatment, by the heavier products arising from the distillation of coal tar, would scarcely exceed ten cents. In the treatment of railroad ties and the timber for bridges and wharves, acids and alkalies are especially objectionable because they corrode the iron bolts and spikes that are necessarily employed, and thus impair and ultimately destroy the wood with which they are in contact. If copper nails and sheets be employed, as in covering the hulls of vessels, the corrosion must be more rapid when such substances have been employed in the preparation of wood. On the contrary, oil prevents this corrosion of the metals, and in this respect it contributes essentially to the inherent durability of any structure that may be made of such composite materials.

SPECIFICATIONS OF THE ROBBINS PATENT.

To All Whom it may Concern:—Be it known, that I, Louis S. Robbins, of the City, County and State of New York, have invented a new and improved process for preserving wood from mold or decay; and I do hereby declare that the following is a full, clear and exact description thereof, which will enable those skilled in the art to make and use

© 1866 SCIENTIFIC AMERICAN, INC.

the same, special reference being had to the accompanying drawings forming part of this specification.

It is a well known fact that woods when cut down, and separated from the roots which supply it with its antiseptics, immediately becomes affected by exposure to the heat and the moisture of the atmosphere; the former of which rapidly dissipates the fluid or sap of the wood, while the latter impregnates the woody fibers with substances which the wood while growing, by its antiseptics, entirely excluded. These alternate actions upon the wood gradually and finally cause it to decay. To prevent this decay of wood is, therefore, the object of the present invention, and this object is accomplished thereby. The method consists in subjecting the wood to a preservative process by which nearly all of its antiseptics are retained within the same; and for those lost, supplying such substances as will prevent their further waste; at the same time closing the pores and forming such a combination with the fibers of the wood, as will effectually prevent the deteriorating effects of either heat or moisture at ordinary temperatures, or of both upon the same, as hereinbefore alluded to.

Many processes have been heretofore invented for the preservation of wood, some of which were entirely impracticable, while others were only partially successful; but by none could the wood be sufficiently impregnated or saturated with the preservative compound, to insure its preservation for a great length of time, owing to the manner in which the same was applied to the wood.

One form of apparatus for carrying out my improved process, is represented in the accompanying plate. A, in the drawing, represents a retort, made of any desired form or size, in which coal tar, resin, or other oleaginous substances or compounds are placed, and subjected to the action of heat from any suitable furnace. B represents the man-hole in the upper portion of the retort, used in cleansing the same or in changing its contents. C C, a pipe communicating with retort A, at or near its top, passing to, and communicating with, chambers or receptacles D. E represents the discharge pipe, employed for removing the remaining contents after the operation is over.

Heat being applied to retort A, containing the coal tar, etc., as described, oleaginous vapors are generated therein, which pass out of the same through the connecting pipe, C C, into the wood chambers, D, or into only one of the same as may be desired. The heat thus applied, first causes the surface moisture of the wood to be removed therefrom, taking the form of steam and condensing on the sides of said chamber, from which it is drawn off through pipes, H, which may be placed in or near the bottom.

Having thus removed the surface moisture from the wood, I then thoroughly impregnate and saturate it through all its pores and fibers by the oleaginous vapors and heavier products of the distillation, until it is made impervious to moisture, and so as to entirely resist the action of the atmosphere, when it may be removed from the chambers, D, through the doors, M M; when the chambers are again to be charged with wood, and so on as long as may be desired.

In this connection we give the outlines of another view of the apparatus, so modified as to adapt it to use in cases where it may be convenient to have the retort and furnace under the chambers containing the lumber. A marks the retort as in the former illustration. D D, exhibits the ends of the receiving chambers, one of them being filled and the door open, while the door of the other is closed.

In the operation of my process, a temperature of from 212° to 250° Fahrenheit is sufficient to remove the surface moisture from the wood; but to saturate the same with oleaginous vapors and other products, it is best that the temperature should be raised to 300° Fahrenheit, or higher if necessary.

From the above description it is apparent that, by my process, I am enabled to more completely saturate the wood with the preservative compound than has been, or can be done by any of the processes heretofore in use; for the reason, that I cause the preservative compound to permeate the pores and fibers of the wood, in a vaporized state, while in the others it is made to enter in a liquid state; and it is also evident that it is accomplished in an economical, expeditious, effective and practical manner.

I do not intend to limit myself to any particular form of apparatus; nor do I intend to limit myself to the removing of the surface moisture from the wood by means of oleaginous vapors, as herein described, as there are various ways in which the same can be accomplished with the use of heat. But what I do claim as new, and desire to secure by Letters Patent, is:—

The process herein described for preserving wood from mold or decay, the same consisting in first removing the surface moisture from the wood, and then charging and saturating the same with hot oleaginous vapors and compounds, substantially as described.

Also removing the surface moisture from wood by means of hot oleaginous vapors, substantially as herein described. LOUIS S. ROBBINS.

Witnesses:
M. M. LIVINGSTON,
ALBERT W. BROWN.

It will be perceived, from an examination of the foregoing specification, that Mr. Robbins's method of treating wood possesses great advantages over even that of Bethell. Indeed, it will be obvious on a moment's reflection that his process must be far more rapid and complete. For while Bethell employed his oleaginous compounds in a liquid state, Robbins uses the same materials in the form of vapor, in which condition they are sublimated to a degree which is eleven hundred times finer than they are in the state in which Bethell employed them, and, of consequence, so much the more penetrating. In this state of extreme attenuation, the elements which preserve the wood are more readily admitted—the capillary action being greatly accelerated and made to thoroughly permeate the entire structure of the wood. At the same time the hot vapor opens the pores and expands the wood, so that a larger quantity of the oily compound is admitted. The pores being thus filled, the contraction which naturally results from the cooling process, seals them, if possible, in a still more effectual and lasting manner. The vast superiority of the Robbins process, as compared with that of Bethell, can only be fairly estimated by those who realize the immense difference between the effectiveness of water and steam in their relations to chemical action and mechanical force.

But we should fail in our attempt to comprehend the full value of this improvement were we to overlook other important considerations. It is to be observed that this process renders light and porous wood as solid and durable as the finest-grained timber, and perhaps equally well adapted to all ordinary purposes in the arts. In fact, it may admit of a question whether the most porous wood may not be made to last even longer than the wood that is least so, from the fact that it absorbs a greater quantity of the material on which its preservation is made to depend.

Wood, treated by the Robbins process, requires no paint as a means of protecting it from the ordinary action of the elements. Paint is, therefore, useless except for ornamental purposes; and even then, so much of it as is required to fill the pores is saved when the wood has been previously treated by this method, and this saving will doubtless cover the cost of the most effectual treatment under the patent.

It is, moreover, important to observe, that this process seasons the wood most effectually; and inasmuch as it thoroughly protects it from the influence of moisture, it follows, that wood so prepared is neither liable to swell, shrink, warp nor crack.

A just estimate of this last and most perfect process for preserving wood might suffice to startle every thoughtful man in the community. Experience proves that to insure the traveling public against accidents, resulting from decayed railroad sleepers, the whole should be removed at least once in five years. The present cost in the Middle States is seventy-five cents each; and it will be safe to assume the average price to be fifty cents throughout the entire country. Add fifty cents each to this, as the inevitable cost of removing the old sleepers, putting down the new, and replacing the rails, and it will be perceived that every new sleeper that is supplied involves an expense, in material and labor, of one dollar. As railroad ties are placed at an average distance of about two feet, it follows that 2,500 are required in a single mile. Hence, it costs about twenty-five hundred dollars ($2,500) per mile to remove the old sleepers and lay down the new ones. As there are 50,000 miles of rail tracks in the United States, it will appear that $125,000,000 are demanded to support the rails of all the roads in the country.

These figures indicate the enormous expense of a single renewal of the sleepers of all our railroads. If thus renewed once in five years, the inevitable cost, in the next twenty-five years, of the new ties for the roads already constructed, will amount to 625,000,000 of dollars! Now, it being demonstrated that sleepers, prepared by the process already described, will last a quarter of a century, the conclusion is inevitable, that the universal application of the Robbins process, to the ties of all our roads, would involve a saving—after deducting the cost of their preparation under the patent—of some 450,000,000 of dollars. Moreover, if the progress of the construction of such roads, for the next twenty-five years, should continue to be, at the rate it was during the six years next preceding the late rebellion, (2,000 miles per annum), the saving of money in railroad ties, and in the labor of laying them down, would not fall much short of 700,000,000 of dollars!

But the complete contrast between the Bethell and the Robbins processes, requires the presentation of another important feature. The wood prepared by Bethell was only fit for timber that was fashioned and adapted to the rudest forms and uses, such as railroad ties, the piles for bridges, wharves, etc., for the reason that the surface was left covered with the grosser products of coal tar. But as the Robbins process applies the same in the form of vapor, the wood is left clean; and after a few hours' exposure to the air, it is fit to be handled and used for any purpose in which elegant workmanship is required.

Apart from mere pecuniary considerations, the preparation of railroad timber by this process, is immensely important as a means of safety. A large number of railroad accidents occur in this country from the rapid decay of the sleepers. This is of course unequal, some of the ties rotting and giving way, while others remain in a sound state. This causes an oscillating and irregular motion of the cars, which sometimes throws the train off the track; it also occasions an unequal pressure on the rails, which are liable to break. The violent motion, resulting from the uneven surface of the track, causes unequal friction, and an undue strain on the axles, and on the flanges of the wheels, the breaking of which constitutes another prolific source of railroad disasters.*

The direct loss to our railroad corporations, in the destruction of property by such accidents, is very heavy; but it would be quite impossible to compute the still greater loss that is indirectly sustained. The fact cannot be disguised, that the seeming indifference of railroad companies to the public safety, has the effect to greatly diminish the travel. Multitudes who would make frequent excursions for pleasure but for a feeling of insecurity, now only venture from home when the pursuits of business or other circumstances imperatively demand it. Beside, if the distance be short, many persons use a conveyance of their own, when they might travel by rail at less expense of both time and money. It is a false economy that refuses to accept and apply a great improvement when once it is demonstrated to exist; and our railroad directors must be made to feel that it is even criminal to disregard such a discovery when it is known that the public safety demands its immediate adoption.

We have only estimated the value of Mr. Robbins's process for preserving wood in its relation to a single use. And yet, wood is the chief material employed in the world's navies and merchant marine; in the construction of our dwellings, workshops,

*The great destruction of life by railroads in this country, is rapidly becoming a cause of national reproach. It is well known that railroad accidents are far less numerous in Europe, than in this country. Nor is the comparative infrequency of such disasters in England, France and Germany, altogether attributable to the superior construction of their railroads. It is due in no small degree to the fact, that their railroad ties are subjected to some process which renders them less liable to decay.

© 1866 SCIENTIFIC AMERICAN, INC.

warehouses, carriages, fences, agricultural implements, and household furniture. The millions require it in fashioning the implements of toil; three-fourths of the products of the earth, and of all human industry, are inclosed in wood for preservation or transportation; the masses, in all countries, warm their dwellings and cook their food by its combustion, and the whole vast commerce of the world still rides on every ocean and sea in vehicles of wood.

The new process is equally applicable to wood in all its uses except for fuel. But we have no data from which a reliable estimate can be made of the immense saving which would result from its universal adoption.

In the engravings accompanying this lengthy article on preserving wood, the same letters of reference indicate the same parts as are referred to Mr. Robbins's patent, the specification of which we publish entire.

To any of our readers who may like to know Mr Louis S. Robbins's address, we would state that he has an office at No. 68 Broadway, New York.

FARMER'S CLUB.

The Farmers' Club of the American Institute held its regular weekly meeting at its rooms at the Cooper Institute, on Tuesday afternoon, Jan. 30th, the President in the chair.

THE WAY TO RAISE PEACHES IN COLD CLIMATES.

W. H. Sanborn, of Vandalia, Ill., sent a communication describing his method of raising peaches in latitudes too high for their successful culture in the usual manner. He had tried his plan for several years in New Hampshire with success. On setting out his young trees he cuts off the trunk one foot above the ground, and paints the wound with a stiff water-proof paste, made by dissolving gum shellac in alcohol. He then trains the branches out horizontally like the spokes of a wheel, and the vertical branches that rise from these he cuts back one-half in midsummer. During the winter he keeps his trees covered with straw or bog hay, allowing the covering to remain till the buds begin to swell.

TO KEEP MILK SWEET.

Mr. Kavanah, in reply to a question by a correspondent, said that milk may be kept sweet by keeping it in a clean room in company with fresh water. In some places it is customary to set tubs of water along the middle of the cellar, cave, or milk house, with an arrangement of pipes by which the water can be readily changed twice a day. It is found that this arrangement prevents the milk from being soured even by lightning.

THE BEST WAY TO MAKE A HOT BED.

Mr. Quinn described at length the latest and most approved plan among market gardeners of constructing hot beds. Some horse manure is moistened and piled up to heat about the 1st of January, and the hot bed is formed in the month of February, from the 15th to the 20th. A site is selected with a southeast exposure, and a trench is dug 3 feet in depth, 6 feet in width, and of any length desired. This trench is filled with horse manure—first, 18 inches in depth of cold manure, then 18 inches of hot, then 8 inches of cold, next a thin layer of hot, and finally a thin layer of cold; the whole being thoroughly trodden down, and just about filling the trench. A frame of rough boards is made of the same width and length as the trench, 2 feet in hight on the northerly side and 15 inches on the southerly side. This is set into the trench before the filling is completed, so as to bring the top of the frame just above the level of the ground. Fine, rich, mellow soil is filled into the frame on top of the manure to the depth of 8 inches, the seed is sown on the surface of this soil, and is covered by sifting fine earth upon it through a sieve. The frames are crossed at intervals of 3 feet by bars to support the sash—the bars having raised pieces in the middle, between which the sash slides up and down. The bars for the glass are laid in only one direction—across the frames—the glass being laid in the manner of shingles. Formerly 8x10 glass was used, but now the preference is given to 4x6—the sash bars being placed only 4 inches apart. The speaker thought it well to have the glass cut with the lower end rounded, in order to lead the dripping water to the middle of the panes. Tomatoes, cabbage and lettuce, requiring about the same temperature, and germinating in about the same time—from 48 to 60 hours—may be planted in the same frames; but peppers and egg plants demand more heat, and take some ten days to sprout; they must, therefore, be placed in different frames.

Mr. Bergen remarked that in his neighborhood it was not the practice to mix hot and cold manures, but to build up hot beds with one kind of manure.

Mr. Quinn, in reply, said that by using hot manure, and by transplanting three or four times, they were able to get tomatoes two weeks earlier than they could by using cold manure and by one transplanting. This is very important, as the earliest tomatoes bring $3 and $4 per basket, while he had sold thousands of baskets later in the season at from 10 to 18 cents per basket. Last year he sent to market 10,000 baskets of tomatoes.

TRACEY'S IMPROVED GANG SAW GAGE.

Much time and care have been expended in the accurate adjustment of gang saws. Every change in the thickness of the lumber requires a new arrangement.

This invention is intended to facilitate the operation of setting. With the gage holders once fixed in line in the saw frame, a number of changes can be readily made by any workman in a few minutes.

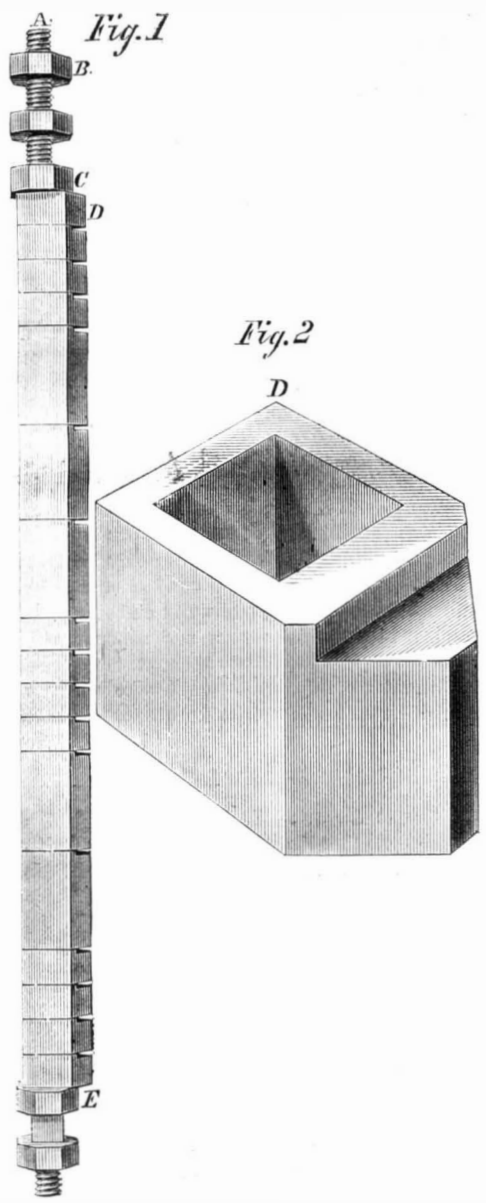


Fig. 1

Fig. 2

A reference to the engraving will show the simplicity and utility of the apparatus. It is claimed that two-thirds of the time of the mill and of the workmen is gained over the old methods.

The inventor uses eight gage bars with movable gages of different lengths for each; four to be in use at a time, and four to be prepared in advance for a change of saws. A proper combination of the various sized gages enables the operator to saw any thickness from one inch upward, varying by one-quarter of an inch.

Fig. 1 is a perspective view of a gage bar with nuts and gages. A is the bar, one inch square. B B B are nuts by which the bar is fastened in the saw frame. C is a nut which holds the gages firmly against the collar E. F is a collar fast to the bar, resting firmly against the gage holder in the saw frame. When the gage holders are once fixed in line, the collars, being of uniform thickness, will keep all the gages in line also. D is one of the movable gages which, sliding upon the bar, hold the saws in the gains in their beveled edges.

Fig. 2 is a perspective view of a movable gage for sawing inch boards, drawn full size.

For further particulars address James Tracey, Brewer Village, Penobscot Co., Maine.

Burning Smoke.

An apparatus for the consumption of smoke has been applied to the furnaces of the North British Rubber Works by a Huddersfield firm. The apparatus is easily managed; it consists of two sets of doors; the outer or closed door is in two halves, and opens from the center; the inner door, which works on the same hinge, is perforated with hexagon-shaped holes, and is meant to break up the volume of air going into the furnace into a sort of blast. This blast is counteracted upon by an opening for air underneath the furnace dyke, the door of which is regulated by a check rod. When the fire is charged with coal the outer door and the one under the fore dyke are left open, while the inner door is kept shut until the coals are well kindled, when the outer and under doors are closed, and the furnace goes on burning as if no apparatus were there. A pipe about one inch diameter, and perforated with holes, passes along the front of the ash pit, from which small jets of steam spread along the under part of the furnace bars, supposed to generate air and keep the bars from overheating. The introduction of the apparatus causes little or no alteration in the ordinary furnace, except the taking away of the usual doors, and the putting in others of the construction described. This apparatus, as applied to the fire openings of one great furnace at the Rubber Works, proves its efficiency in burning the smoke; though, as in all cases, the efficiency depends on the apparatus being worked properly by the person in charge of the furnaces.—*London Mining Journal.*

[The idea of generating air from steam jets is absurd.—Eds. Sci. Am.

Official Report of the Cattle Plague.

The return published by the Veterinary Departmet of the British Privy Council, for the week ending Dec. 30th, gives an account of the loss of stock by the disease, from its commencement in June to the end of the year 1865, as reported by the local inspectors. In England 48,964 animals were attacked during the whole period, and of them 11,142 were killed as a preventive measure, 27,177 absolutely died of the disease, 3,655 recovered from the attack, and 6,990 diseased animals were remaining on Dec. 30th, whose fate will be recorded in subsequent returns.

In Wales the disease was confined to the two counties of Denbigh and Flint, and the total number attacked was 2,287; of these 93 were killed, 1,565 died, 218 recovered, and 411 remained under observation.

In Scotland 22,298 animals were attacked; 2,998 of these were killed, 12,749 died, 3,172 recovered, and 6,381 cases were undetermined.

In Great Britain, therefore, the aggregate numbers stands thus—attacked, 73,549: killed, 13,931; died, 41,491; recovered, 7,045; and 11,082 (or 15 per cent of the attacks) are brought forward into the account for 1866.

An Invention Wanted.—The London *Times'* Paris correspondent says:—"A discovery has been made at Toulon, where the iron-plated frigate *Provence* is undergoing repairs, which shows the danger that menaces the entire iron-coated fleet of France. The *Provence* was fitted out for sea only 15 months since, and already a great number of her plates are nearly consumed with rust. The Director of Naval Architecture is of opinion that if a composition be not discovered to prevent the action of rust, the iron-plated fleet must be renewed every five years.

The First Step.—In the House of Representatives, on the 5th inst., Mr. Allison introduced a bill fixing a standard of weights and measures corresponding with the French decimal system.

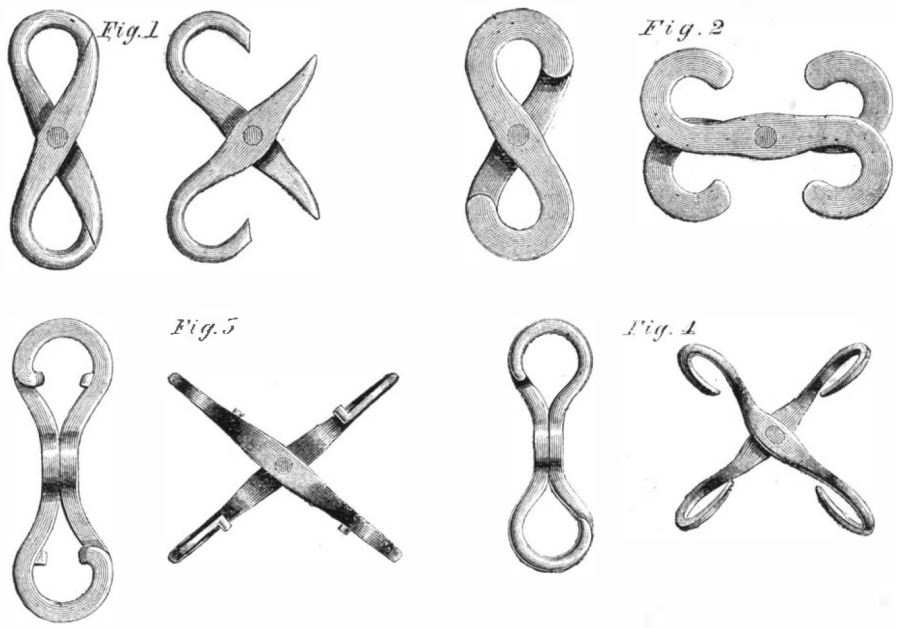
© 1866 SCIENTIFIC AMERICAN, INC.

Improved Connecting Link.

This engraving represents a new and most useful fastening which can be applied to a great variety of purposes. It is principally designed for teamsters' and farmers' use. It is intended to take the place of the old-fashioned lap-ring. This ring consists of an iron link, not welded at one end, but having the same flattened so that they pass each other. When this ring is used, the flattened ends must be pried open, the parts to be connected inserted, and the ring hammered together again. Of course, this is most troublesome; not only this, but from constant opening and shutting, the flattened ends get broken off so that the thing is useless.

With this link it is only necessary to swing one part past the other, and then shut them together when the pieces to be connected are in place. This holds all snug and fast, beyond the possibility of detachment. Fig. 1 shows the link in one form, both open and closed. Fig. 2, another kind, both opened and closed. Figs. 3 and 4 are views of all other kinds, all being on the same principle. The strength of this link has nothing to do with the pivot—that is merely provided to keep the two parts together, the strain coming on the ends of the hook.

The demand for these links, by farmers and others, has been very great, and the inventor, who is a Texan, was receiving many orders for them at the breaking out of the Rebellion. The troubles which followed, however, deprived him of all opportunity and means to prosecute his business. He now desires to sell the right to the patent. It seems to be a most useful article. For further information address the patentee, John P. Kirk, Leggett's Hotel, 46 Chatham street, New York.



KIRK'S CONNECTING LINK.

The Photo-Miniature.--Beecher's Formula.

First: Take the whites of two eggs and two ounces of water, beat well to a froth, and let it settle for two hours and pour off the clear solution.

Second: Coat your white plate with this solution (as you would with collodion), and set away to dry. When dry take in your dark room and coat the plate with the "opal solution," which is made thus:—

Plain collodion 8 oz. (thinner than you would use for iodizing), then dissolve in as little water as possible 60 grains nitrate of silver, and add this to the collodion and shake well. Then dissolve 16 grains of strontium in as little water as possible, and add this to the collodion, and shake well. Then dissolve 10 grains citric acid in as little water as possible, and add to the collodion. Shake well, and you have the opal solution.

When dry, put your negative in the printing frame—lay the opal prepared plate on the negative, and print from 10 to 15 minutes in the sun, and print much darker than you would a photograph.

Tone and fix as you would a photograph, only you need not wash before toning—and wash but little before fixing. The "opals" tone in one-tenth the time of a photograph.

Keep the opal preparation in a dark room. Have your toning bath a little alkaline, and not as strong as for toning photographs.—*Humphrey's Journal.*

Spider Silk.

During the summer of 1864, the 55th Mass. Colored Volunteers were stationed at Folley Island, S. C. In August, Major Sigourney Wales was detached to command the outposts on the adjoining islands. There his duty obliged him to visit all parts of the island, day and night. During his rides he found great numbers of large spiders, whose webs, extending from tree to tree, often measured from six to ten feet, with threads of a silk-like texture, strong, elastic, and of a bright gold color. These webs were a source of annoyance, especially at night, when the most disagreeable sensations were experienced by their tenacity and resistance to repeated attempts to brush them from the person. Speaking of this to the assistant surgeon, it led him to mention some curious experiments made by him the year previous, in which he reeled upon a pencil or quill many yards of web from a single insect.

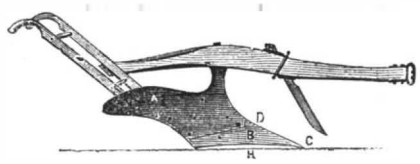
Persons familiar with army life are aware that its leasure hours are many; these Major Wales had employed, at intervals, in carving mementoes, and in this connection it occured to him, that if he could draw this golden thread upon a ring, it would make a valuable souvenir of war.

Having satisfied himself of the practibility of his design, by securing several of the spiders and reeling their web upon an ebony reeler, he proceeded to carve out of hard rubber a ring, with raised rims on its outer surface; this he secured to a cork, through which a large shawl pin was thrust, forming a wheel and axle, and giving increased velocity.

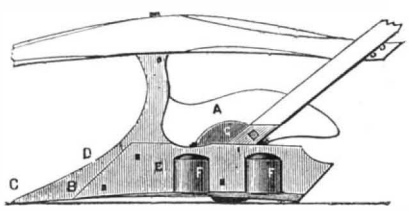
With a supply of spiders confined in a cigar box, he completed this ring; which, when finished, presented two black rims inclosing bands of gold, one-eighth inch in width, so much like gold as to be readily mistaken for the true metal.

GREEN'S PLOWS.

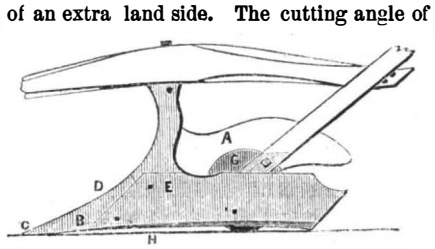
These plows, says the inventor, being constructed upon entirely new principles, are fast becoming the leading plows of the country. They are recommended



to work in a superior manner upon every variety of soil—sticky or otherwise. A friction-roller landside, F F, and center wheel, G, being attached for the pur-



pose of heavy sod plowing and easing the draft, which can be changed to plain, for plowing stubble, by the aid of an extra land side. The cutting angle of the



share, B, is about 28° or 30°, extending the entire length of the lower edge of the board, A, and in connection with the concavity, H, effects a quick and easy entry. These plows are of light draft and easy control, turning the furrow in a superior style. They pulverize the soil finely, so that it is in a suitable condition to absorb fertilizing properties from the atmosphere.

A new subsoil plow is also manufactured with flat double-wing shares for the cultivation of all kinds of roots, corn, etc. A large size of this new plow is likewise made, with changeable share and flanges, for various purposes, such as under-draining, scarifying, and renovating old pastures and meadow lands.

Small plows are made which equal in size the Horton & Depiew—19 and 19½ inches.

These plows can be seen at Goodwin's, No. 31 Fulton street, or at E. H. Reeves's, Water street, New York; also at the Peekskill Plow Works, Peekskill, N. Y. For further information address L. Green, Peekskill, N. Y.

Chloride of Lime for Vermin.

Some years ago I read in a French scientific periodical, that chloride of lime would rid a house of all these nuisances. I treasured up the information until opportunity offered for testing its value, and this occurred some four years since. I took an old country house infested with rats, mice and flies. I stuffed every rat and mouse-hole with the chloride. I threw it on the quarry-floors of the dairy and cellars. I kept saucers of it under the chests of drawers, or some other convenient piece of furniture; in every nursery, bed-room, or drawing-room. An ornamental glass vase held a quantity at the foot of each staircase. Stables, cowsheds, pig-sties, all had their dose, and the result was glorious. I thoroughly routed my enemies, and if the rats, more impudent than all the rest, did make renewed attacks upon the dairy in about twelve months, when, probably, from repeated cleansing and flushing, all traces of the chloride had vanished, a handful of fresh again routed them and left me master of my own premises. Last year was a great one for wasps; they wouldn't face the chloride; though in the dining-room, in which we had none—as its smell, to me most refreshing and wholesome, is not approved by all persons—we had a perpetual warfare. And all the comfort for eightpence!—*Cor. London Builder.*

The New Cable.

Birmingham (England) is again to have the credit of manufacturing the wire for the new Atlantic cable, and Mr. James Horsfall has commenced the work. Throughout the series of mishaps which occurred in laying the cable in August last, no fault has ever been found with Mr. Horsfall's homogeneous wire; and the new cable will be the same as the last in size, material and quality. We believe that the conducting copper wire will also be made by Birmingham manufacturers, and the hempen covering of the cable will again be made by Messrs. J. & E. Wright, of Garrison Lane. The manufacture of the cable will be undertaken by the Telegraph Cable Construction Company. The company intend to pick up the cable already laid, and complete it, and their engineers entertain no doubt whatever of being able to do so; and the new cable is intended for a second line of telegraph, the directors feeling convinced that one medium of communication between England and America will be altogether insufficient for the commercial requirements of the two continents. Both cables will be completed next summer.

A PARIS butcher has obtained authority to open a shop for the sale of horse flesh, on condition that he will construct a special slaughter-house for the horses, to be placed under the superintendence of an inspector. The opening of the shop is to be celebrated by a banquet, at which horse-meat will form the principal dish.

© 1866 SCIENTIFIC AMERICAN, INC.

Correspondence

How to Make Mill Picks.

MESSRS. EDITORS:—I ran a flouring mill of my own for twenty years with four run of burrs, and at first was much troubled to get picks good for any thing (I was in Indiana). I sent to Cincinnati, Columbus, Indianapolis and some other places, and tried all the smiths about home, to but little purpose. Being in a hurry one day I thought I would try my own luck, and threw a few bricks together on the ground, put some charcoal in the circle thus made, and constructed a blow-pipe by boring an auger endways through a piece of wood (or nearly through), and with a small bit through at the end. I kindled a fire in my forge thus constructed, and with my mouth I heated the pick red hot, and with a broad-ax stuck in a block for an anvil, and a claw hammer, drew the pick to an edge. I heated it again in the same manner and cooled it in water, and when sharpened it proved a first rate pick. This brought me to the conclusion that, in general, picks are made too hot and hammered too hard. In tempering they are heated too hot and the temper drawn to keep it from being too brittle. I put up a shop of my own, and when working on a pick heated slowly and evenly, I hammered lightly and briskly until the pick was pretty cool. I then heated it slowly again and evenly to a low red heat, and dipped point foremost in the water as far as I wished the temper to rise from the edges, and drew it out before it was quite cold, keeping the heat as high as it would bear and not draw the temper until it was cold; then, without lowering the temper, I took it to the grindstone and ground it to a tolerable thin edge, whetted it on an oil stone, and it was ready for use. I directed the miller to strike no harder than was necessary to crack the face of the burr, and the pick would last a long time; when the edge was worn out I repeated the operation, drawing the temper and filing off all the bruised edge to the solid steel. After this experience I had no more trouble with picks. A pick is not worth a cent if the temper is drawn any after it is hardened, the temper must be hit in this heating, or the pick is of no account; at least such was my experience.

N. HOLLINGSWORTH.

Rozetta Precinct, Henderson Co., Ill.

Black Walnut Polish.

MESSRS. EDITORS:—Edward Everett, in your paper of Feb. 3d, inquires how to give to black walnut a dark, smooth, dead surface. Let him try the following method:—

Take asphaltum, pulverize it, place it in a jar or bottle, pour over it about twice its bulk of turpentine or benzole, put it in a warm place, and shake it from time to time. When dissolved strain it and apply it to the wood with a cloth or stiff brush. If it should make too dark a stain, thin it with turpentine or benzole. This will dry in a few hours.

If it is desired to bring out the grain still more, apply a mixture of boiled oil and turpentine; this is better than oil alone. Put no oil with the ashphaltum mixture, as it will dry very slowly. When the oil is dry the wood can be polished with the following:—Shellac varnish, of the usual consistency, two parts; boiled oil, one part. Shake it well before using. Apply it to the wood by putting a few drops on a cloth and rubbing briskly on the wood for a few moments. This polish works well on old varnished furniture.

H.

Query for Molders.

MESSRS. EDITORS:—As almost everybody calls on you for information, I thought I would do the same. I would like to have you inform me as to the best method for mixing facing sand for machinery castings. We have been using it lately, but with unsatisfactory results. The castings are not smooth as I have seen at other founderies.

S. V. E.

Waterloo, Ill., Jan. 28, 1866.

MESSRS. EDITORS:—Through the columns of your very valuable journal, will you call the attention of the inventive genius of the country to the great necessity which at present exists for a cotton-stalk puller. A visit to the South, and careful examination of cotton stalks in various localities, would give one a better idea of what is required than the most minute description could possibly convey; and I am satisfied that a fortune awaits the successful worker in this field.

E. H. B.

LATEST FOREIGN INTELLIGENCE.

TIMBER FOR SHIPBUILDING.—The French Government has given publicity to the following:—"There exists in the territory of Washington, in the United States of America, a channel formed by the waters of the Straits of Fuca, which penetrates 150 miles into the country. This stream known as Puget's Sound, is sprinkled with numerous islands, which contain forests of pine trees of the species so much in demand for shipbuilding. Among these islands is one called Lamano, on which the pines attain gigantic proportions. Some French vessels have already taken freights of timber from this neighborhood. The ships sent to Puget's Sound for spars should be of not less than 700 tuns capacity. The cargo may be completed with planks, small spars, and squared wood fit for railway sleepers. It is very important that, in order to save loss of time and money, the shipper should send notice from San Francisco to the timber merchants in the Sound, informing them when the vessel may be expected. The obtaining and shipping a cargo occupies about two months.

COPYING BRONZES.—An application was recently made for permission to take a model in wax and plaster of the splendid bronze door of the baptistry of St. John, at Florence. The authorities, fearing the effect of such an operation, appointed a commission to examine the subject—the result was a refusal to allow the copies to be made. The objections were, that injury was done to the fine lines, and also caused the removal of the fine tone which forms on the surface of the bronze, and imparts to it the rich and peculiar effect so highly prized by artists and amateurs.

WE understand that the Whitworth and Armstrong guns used in the competitive examination have been subjected to destructive tests at Woolwich, and have been cut in two. On investigation it appears that the initial center tube of the Whitworth is destroyed; that the second coil is cracked; that the third coil is cracked; and that only the outer coil is sound. The inner tube of the Armstrong is split; all the others are sound.—*Mechanics' Magazine.*

WHITE PIGMENT.—Mr. John Dale, of Manchester, proposes to decompose the material called satin white, containing sulphate of lime and alumina by chloride of barium, or strontium, so as to replace, or partially so, the sulphate of lime by the sulphates of barium or strontium. The proportions to be used of the chlorides of barium or strontium will be according to the amount of sulphate of lime to be replaced. Secondly, he proposes to produce a substitute for satin white, by using caustic baryta or strontia, instead of lime as usual.

ELECTRIC LIGHT.—At the last sitting of the Academy of Sciences, M. Leon Faucault produced a new apparatus for regulating electric light. It keeps the two charcoal pencils at the distance required by an automatic motion, which pushes them forward or draws them back, as occasion requires. The two sets of clockwork which produce this effect, communicate with an electro-magnet, which, as it bends either to the right or left, puts the corresponding set in motion, and when in an intermediate position stops the motion of both. But in order to establish a connection between the two sets, so that the one may not be independent of the other, M. Faucault has introduced a sun-and-planet wheel, which acts on the catch of the electro-magnet.

THE Admiralty has accepted the tender of Messrs. John Brown & Co. for the manufacture of the rolled armor plates of 8 inches and 9 inches in thickness for the new iron-clad frigate *Hercules*; also the tender of Messrs. Cammel & Co., as well as that of the Mersey Iron Company, for the manufacture of the 6-inch plates required for the same ship. The contract to be paid for the 8-inch and 9-inch plates is $165, and for the 6-inch plates $146 and $145 per tun.

"CHEMICUS" writes to a foreign cotemporary that he practically tested the American clock-boiling recipe and found it answered well. He boiled his clock for some hours in caustic soda, washed copiously, hung on the jack and dried quickly. The clock was an eleven shilling one, had gone regularly for ten years, but lately taken to stopping through clogging up of the pinions; it has since behaved itself well, gone regularly, and kept good time. The treatment is peculiarly applicable to these clocks, for, owing to their low price, our professional clock cleaners do not like to meddle with them.

THE London *Engineer* says:—Esparto, the newly imported spanish grass, is likely to be largely used, with cotton, hemp, and wool, as one of the staples of manufacturing industry, in addition to the valuable resource which it seems likely to prove to our paper manufactures. About 160,000 tuns have already been imported, at an estimated price of 82 shillings per tun.

CORNISH PUMPING ENGINES.—The number of pumping-engines reported for November is 31. They have consumed 2,307 tuns of coal, and lifted 17·8 millions tuns of water 10 frames high. The average duty of the whole is, therefore, 51,900,000 lbs. lifted 1 foot high, by the consumption of 112 lbs. of coal.

THE population of the principal cities of England has been returned as follows:—London, 3,025,936; Manchester and suburbs, 668,001; Liverpool, 479,806; Birmingham, 330,004; Leeds, 225,577; Bristol, 162,508.

THE London *Punch* says:—"A Yankee baby crawls out of his cradle, takes a survey of it, invents an improvement, and applies for a patent before he is six months old."

Breech-Loading Firearms.

The following special order has been issued from the War Department:—

"A board of officers will assemble at Washington, D. C., on the 10th day of March, 1866, or as soon thereafter as practicable, to examine thoroughly the following questions, and make recommendations thereon:—

"1st. What form and caliber of breech-loading arm should be adopted as a model for future constructions of muskets for infantry.

"2d. What form and caliber should be adopted as a model for future construction of carbines for cavalry.

"3d. What form of breech-loading arm should be adopted as a model for changes of muskets already constructed to breech-loading muskets.

"Each person who submits an arm to the above board will be required to state in writing the lowest price at which it will be furnished, in the event of its being adopted by the Government.

"The Chief of Ordinance will furnish the board all the information in his power, and will also provide it with office room, stationery, and a place for experimental firing, targets, ammunition, etc.

"The report of the board will be made through the Chief of Ordinance.

"DETAIL FOR THE BOARD.—Major General W. S. Hancock, U. S. volunteers; Brevet Major General R. C. Buchanan, colonel First U. S. infantry; Brevet Brigadier General P. V. Hagner, lieutenant colonel ordnance department, U. S. army; Brevet Brigadier General Charles Griffin, captain Fifth U. S. artillery; Brevet Colonel J. G. Benton, major ordnance department, U. S. army; Brevet Colonel Horace Porter, lieutenant colonel, aid-de-camp; Brevet Lieutenant Colonel Wesley Owens, Fifth U. S. cavalry.

"By order of the Secretry of War.

"E. D. TOWNSEND.

"Assistant Adjutant General."

LICE ON CATTLE.—A correspondent of the *American Agriculturist* says that "knowing larkspur seed would destroy lice on human beings, he collected a quart of seed, ground it fine, soaked it a week in one gallon of strong vinegar, and then applied it with a sponge to all parts of the animals; has never seen louse or nit since." On the same subject T. F. Haynes, Hartford Co., Conn., writes to the *Agriculturist*:—"I keep lice off my cattle by keeping sulphur and salt in winter where they can lick it when they choose; my cattle have had none since I practised this."

© 1866 SCIENTIFIC AMERICAN, INC.

A WATCH FACTORY IN ILLINOIS.

The demand for American watches is so great that a new factory is about to be started out West to compete with others.

The Waltham Watch Company has earned a high reputation for American watches, and the new concern proposes to employ a number of persons from that celebrated workshop.

It is said, by the *Chicago Republican*, the success of the Waltham Company is shown in the fact that the majority of watches now carried in the pockets of the American people are from this factory. Watches, costly and cheap, large and tiny, jeweled and enameled, are scattered over the country, all bearing the Waltham stamp.

From a recent article, in the same journal, we quote as follows:—

"The National Watch Company, of Chicago, was instituted two years ago, and after perfecting the organization, the Company immediately set about the erection of a factory. The capital stock is $200,000, three-fourths of which is owned by gentlemen resident in Chicago. A special charter was procured, which would enable the directors, at such time as they might choose, to increase the stock to $500,000. The organization is officered as follows:—President, B. W. Raymond, Chicago; Vice-President, Philo Carpenter, Chicago; Treasurer, Thomas S. Dickerson, Chicago; Secretary, G. M. Wheeler, Chicago, Directors; H. C. Culver and Joseph T. Ryerson, Chicago; B. F. Lawrence, Elgin.

"The office of the company is located in the Marine Bank building, on the northeast corner of Lake and La Salle streets, in this city.

"The city of Elgin, Illinois, generously gave to the company 27 acres of ground in the midst of a beautiful park, situated on the east bank of the Fox river, on condition that the factory should be located there. The site is one of the finest which could have been secured. It is just inside the city limits, and is capable of being laid out to great advantage. This work is going forward simultaneously with the erection of the buildings for the manufactory. These are extensive, and so constructed that the greatest possible amount of light may be obtained, the bench of every operative being placed in front of a window, and, indeed, the entire sides of the building present a most complete frontage of glass. The buildings are of cream-colored brick, faced with stone.

"The buildings thus far completed will be capable of turning out 50 watches per day, and will employ 250 operatives. The structures are models of architectural beauty, and would be an ornament to any city upon the continent. No wonder the citizens of Elgin are so proud of their possession.

In addition to the 27 acres donated by the city of Elgin to the National Watch Company, there have been purchased a number of acres of land immediately adjoining, upon which it is the intention of the Company to erect cottages for the occupancy of their employees. Six of these have already been constructed, and are neat, comfortable houses, wearing an air of comfort already inviting.

The grounds around the factory will be graded and laid out in pleasant drives and walks, making the place not only one of industry, but a park which will be a pleasant place of resort. In the work of beautifying the place, several thousand dollars will be expended. The cost of the buildings thus far has been over $40,000, and upon the machinery now in operation in the west wing $60,000 have been expended.

On the first of April the manufacture of watches will commence. All the component parts of a watch, from the delicate hair spring up, with the exception of the cases, will be made here, and put up in tin cases and sold by the dozen to the trade. The beautiful enameled dials will be prepared in the building designed for that purpose, the neat hands will be adjusted, but the outer covering, the cases, will be fitted elsewhere. This is the course pursued in nearly all manufacturing establishments of this kind, and all or nearly all of the watches imported from Europe are cased in this country. It will be more than a year before the company is prepared to manufacture the cases or to supply more than the complete movement.

It is not surprising that the hands of women have been found better adapted to the delicate manipulation necessary in the manufacture of watches than the rough, uncouth hands of men. The majority of operatives in the establishment will be ladies, each having their separate department, and each being paid by the piece for their work.

THE RUSSIAN TELEGRAPH.

Charles S. Bulkley, Esq., the Engineer in Chief of the overland telegraph to Russia by the way of Behrings Straits, returned to San Francisco in December from an exploration of the route, and immediately transmitted to this city a report which is just published.

Several parties are at work. Some making surveys, and others constructing the line; soundings have been taken across Behring's Straits, and across some bays which are to be crossed by submarine lines; and the enterprise is being pushed forward in spite of formidable obstacles with vigorous energy. The following extracts from the report will give a good idea of the present state of this great work.

SAN FRANCISCO, Dec. 18, 1865.

Since my last report, dated at Victoria, our ships have been engaged in transporting material, supplies and parties for exploration of the country through which our lines will pass on both continents, examining harbors and coast lines, locating cable crossings, and, so far as possible, determining the route of these lines. Mr. Conway, in charge of the Fraser's river division, has been delayed in building, owing to the late arrival of materials, but has finished four hundred and fifty miles of line.

The fine bay of Port Clarence has a good entrance, with ten fathoms of water and mud bottom; opening into its eastern side is Grantley harbor, smaller in extent and completely land locked, proving a good landing for our cable, and the only practicable and safe one on the American side of Behring's Straits. The country is of the same general character as that bounding Norton Sound on the east, without timber and covered with a heavy growth of moss, thrown up by the frost in large bunchy masses; below this the earth is thawed about ten inches and beneath frozen solid. Small stunted bushes, bearing berries like wild currants and whortleberries, are the only approaches to trees in this region.

St Lawrence and Mechigme Bays, on the Asiatic coast, proved unsafe for our purpose; shoal water and exposure to south-east gales, driving ice packs in deep masses on the shores, would destroy any cable: both bays were full of old ice, which extended in broken lines 10 miles at sea, through which we worked our way with considerable difficulty. Seniavin Straits offers all the protection necessary, with good bottom, deep water and safe landing in Penkegu Gulf or Abolesher Bay, and from this strait to Grantley harbor the bottom of Behring's Straits is mud, sand, and gravel, averaging about thirty fathoms in depth, and distance between proposed landings one hundred and seventy-eight miles. The Siberian side is more mountainous, without timber and but little moss, except in the valleys. The great masses of sienite that rise in sharp, rough outline at their summits are torn and pushed up by the congealing water in every crevice, until the avalanche of rock comes thundering down to the valley, and lies a gentle slope against the mountain side, and in this way these mountains are sinking to hills, and the masses crumbling to atoms in the intense cold. Valleys wind between them, sometimes partially filled with this debris, but through which we find passage for our land line. The ground is thawed to an average depth of three feet, probably owing to the absence of the thick moss covering of the American side.

The most northern regions through which our lines will pass present no serious obstacles, neither in the construction nor successful operation of telegraphs. The submarine crossings will have the advantage of even and soft bottom, with safe landings, and cables not so long as to make their performance doubtful. The land lines, firmly planted in the frozen earth, will stand as if mortised in rock; no timber to fall across nor sleets to weight the wires, they will stretch over the frozen desolation unharmed and unmolested; besides, with reindeer and dogs, the winter watching will be comparatively easy.

The Behring Straits crossing is one hundred and seventy-eight and Anadyr Bay two hundred and nine nautical miles between landings, with water of such depths that icebergs alone could injure the cable; these are unknown in Behring Straits or south of it; the northward currents preventing any drift of deep masses south. Even when the surface current is changed by strong north winds, the lower water still moves northward.

It has been argued by some that the terrific gales of high latitude opposed insuperable difficulty in keeping up lines; they are not fabulous yet, no more violent than the gales of your temperate zone. The Esquimaux builds his insecure skin tent on the most exposed place, so that the snow may blow away from it, and there it stands, his shelter and home through all the blasts of the long winter. I have seen no Esquimaux on the Asiatic side inhabiting underground winter houses as of old; the excavations and ruins remain, but the people are gone long since, and the present races occupy the ground with their deer-skin habitations.

The Indians of the sea coast are misrepresented; we found them friendly, honest and exceedingly hospitable, never manifesting on any occasion, nor about any of our vessels, the least disposition to steal; but they beg, probably thinking that the white man who has so much can freely give. These people can be made useful with proper management; more so in the future than in the beginning of our work.

Game is abundant during the summer, especially water fowl, and the Indians catch considerable quantities of salmon. Reindeer, rabbits, grouse and foxes (the three last white) seemed plentiful, also seal and walruses.

Reindeer are used for beasts of burden on the coast and in the interior of Northeastern Siberia; in Russian America, dogs alone. With these animals some of our short inland transportation must be accomplished during the winter, especially that over the thick moss covered region. We intend to use every available means of water transportation, and locate our lines so far as possible to favor the plan.

In natural history the collections have exceeded the expectations of the most sanguine, and do honor to the liberality which has permitted this work. No other duty has been neglected for this object, however, but when recreation was necessary or convenient this has proved a pleasing and instructive source.

Our soundings were made with a new instrument, which brings up a sufficient quantity of any other bottom than rock for satisfactory test, and which, during the progress of our work, has added many interesting specimens from the ocean beds to our collections.

The general health of all connected with the expedition has been good. No serious sickness has been reported, no death has occurred, nor any serious casualty befallen any person.

The expedition was delayed so late that I was obliged to abandon my plan of exploring the lower Kvichpak and its mouth, and the through boat exploration of the Anadyr river, but the winter parties now in the field will accomplish the purpose.

All the vessels have rendered most efficient service and are well adapted to the work. There have been but few listless moments or idle hands since our prows were turned fairly north, and, with scarcely an exception, all connected with the enterprise have engaged with interest in the service, and zealously endeavored each to emulate the other in the discharge of their duties. The services of Captain Scammon have been of the greatest importance, not only as a thorough seaman, but particularly as an officer of the Government of the United States, carrying our national flag.

The Russians, sensible of the importance of the enterprise, have neglected no opportunity to express the most kindly feeling and liveliest interest in our success, receiving us with unbounded hospitality. The officials have generously assisted us.

In regard to the British Columbia division, I will report immediately after Mr. Conway arrives.

I am, respectfully yours obediently,

CHAS. S. BULKLEY, Engineer-in-Chief.

Alloys of Manganese.

The preparation of alloys of manganese with iron or copper has been carried on in Germany on a commercial scale by M. E. Prieger. These alloys possess valuable properties, and their applications are constantly improving in number and utility. The *Deutsche Industrie Zeitung* states that to prepare the alloys of iron and manganese (ferro manganese), M. Prieger made a mixture of pulverized oxide of manganese, charcoal dust (corresponding in quantity to the oxygen of the oxide), and of metallic iron sufficiently broken up, such as minute grains of cast-iron filings or steel, etc.; the mixture was put into a graphite crucible, which would hold from 15 to 25 kilogr., and covered with a coating of charcoal dust, sea salt, etc., and heated for a few hours at a white heat. After cooling there was at the bottom of the crucible a metallic homogeneous mass, containing but very insignificant quantities of foreign bodies. Of these alloys the most important are those containing two equivalents of manganese to one of iron, and four eqivalents of magnesia to one of iron, and corresponding to 66·3 per cent, and 79·7 per cent of manganese. Both are harder than tempered steel; they are capable of receiving a very high polish, they melt at red heat, and can be easily poured; they do not oxidize in the air, and even in water only superficially; their white color is of a shade between steel and silver. Alloys of copper and manganese are much harder and more durable. Alloys of tin are very fusible, durable, and easy to work; in color and brilliancy they may be compared to silver. The iron and manganese alloy furnishes a very simple means of adding to iron or steel a given amount of manganese, by the addition of from 1·10 to 5 per cent; very satisfactory results are obtained.

Composition of Lucifer Matches.

Phosphorus, 4 parts; niter, 10; fine glue, 6; red ochre, or red lead, 5; smalt, 2; convert the glue with a little water by a gentle heat into a smooth jelly, put it into a slightly warm porcelain mortar to liquefy; rub the phosphorus down through this gelatin at a temperature of about 140° or 150° Fah.; add the niter, then the red led, and lastly the smalt, till the whole forms a uniform paste.

MR. HARTNUP, the astronomer to the Liverpool Corporation, reports that during the recent storm, and taking the twenty-four hours ending nine P. M. 2d of January, the extreme pressure of the wind was 10 lb. on the square foot.

© 1866 SCIENTIFIC AMERICAN, INC.

LOVELAND'S DOUGH KNEADER.

The object of this machine is to facilitate the labor of kneading dough for bread and pastry; it is well known to housekeepers that this is one of the most tedious and exhausting duties they have to perform. The design is to work the leavened mass as thoroughly as possible, so as to render it light and spongy in texture. To accomplish this the apparatus consists of a set of rollers, A, one being fluted longitudinally, the other being grooved so that the grooves cross the fluted parts of the upper roll. The ends of these rolls are fitted in a standard, B, at the side, and provided with an elastic band, C, which keeps them in contact, but also allows them to rise readily as the dough is passed through.

The operation is obvious. When the handle is turned the rolls are revolved and the dough is drawn

in between them; the motion is then reversed, and the same process takes place, being repeated as often as deemed necessary. All parts of this machine are easily taken out and cleaned, should dough adhere, and it may be also used for working butter.

It was patented through the Scientific American Patent Agency by J. C. Loveland, on Jan. 16, 1866; for further information address him at Springfield, Vermont.

The American Institute.

The usual quarterly meeting of the members of the American Institute was held Thursday evening Feb. 1st, at their room in the Cooper Union—General Wm. Hall occupying the chair.

After the reading of the minutes the reports of the committees were in order. The Committee on Manufactures, Science and Art reported, among the objects brought to their attention, a self-recording barometer, which marked the slighest variations of the atmosphere and printed the fact at the same time. The improvement was applicable, and would be applied to the thermometer.

The Committee on Agriculture reported that a great deal of interest had been manifested in the meetings of the Farmers' Club. Twenty-five thousand packages of seed had been distributed during the past year—a proof of the growing popular taste for floriculture. The report closed with complimentary allusions to the late Prof. Mapes.

The report of the Board of Managers detailed an account of the operation and results in connection with the annual fair, which, in its success, particularly in the matter of machinery, had surpassed expectation. The total receipts were $29,255, against a disbursement of over $26,000, but the surplus for the treasury was about thirteen hundred dollars.

A motion to accept the report and place it on file was followed by a motion to amend, by referring the financial part of the report to the Committee on Finance for investigation.

Mr. Godwin during the prevalence of the matter under consideration was desirous of making some observations. He charged the managers with incompetency, but was declared out of order.

A scene of some confusion ensued, during which considerable misapprehension seemed to exist in the meeting as to which was the exact motion before it. At length the report was accepted and amended.

The Committee on Commerce next reported. The question of the relative economy of steamers or sailing vessels had received their consideration. For coasting trade and internal navigation there was no question as to the preferableness of the former; but in cases of long voyages it was doubtful yet whether steam had any advantage.

A communication was read from a resident of Jersey City claiming that, in awarding the medal for a certain steam pump at the last fair, there had been a violation of the by-laws of the institute, which prohibits the award of a medal to any member of a committee.

Mr. Dawson hoped that the trustees, to whom the matter was to be referred, would also consider the case of a certain pianoforte company to whom a gold medal had been awarded.

The Chairman said he knew the meaning of the movement, and that it was an insult to himself.

Mr. Dawson—You say it is an insult?

The Chairman—Yes, sir, I consider it as an insult. As to the pianos, I have nothing to do with them except to sell them, as I would anything else.

The communication was referred.

Mr. Rich moved to instruct the secretaries to prepare and have printed a list of the members of the society.

Mr. Bull said there was already a great deal of work on the hands of the secretaries. Besides, what motive was there for so doing.

Mr. Rich wished to know what objections there was against it.

Mr. Bull expressed his belief that there was a covert reason for requiring the list.

Mr. Rich said that he could explain the reason, and implied that it might not be very agreeable to state.

Several motions and amendments succeeded each other during a very stormy time, accompanied with personal remarks, and attended with a rather acrimonious debate. At length the motion was referred to the committee having the printing of the by-laws in charge.

Mr. Dawson now arose and read a paper, in which he complained and charged that there had been a violation of the by-laws as above in the award of the pianotorte medal and a certain other medal, and moved a resolution that the Board of Trustees examine the matter.

The consideration of the resolution created another exciting scene.

Mr. Dawson in response to a remark from the Chair, said he hated to see sneaking even in gray hairs.

The Chairman repelled any imputation of sneaking.

Cries of "order," "order."

The resolution was finally referred.

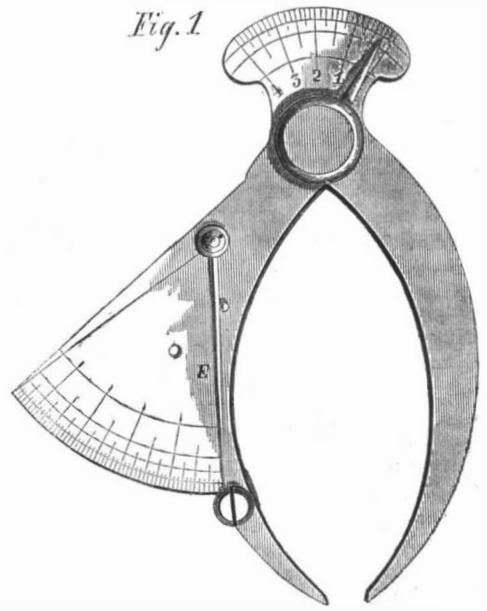
The Nominating Committee next reported. Horace Greeley was their choice as candidate for the presidency of the Institute at the ensuing election.

The meeting then took a recess until Friday evening, Feb. 2d, to act upon the nominations reported by the committee.—*N. Y. Herald.*

SOPER'S REGISTERING MICROMETER CALLIPERS.

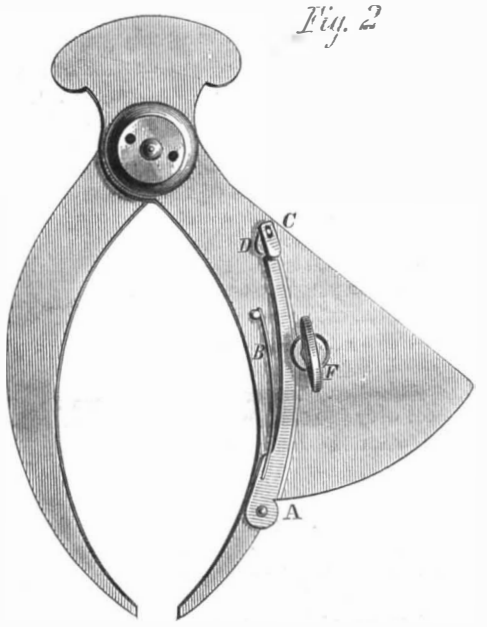
It is surprising that, with the universal use of callipers among mechanics of all trades, so little attention is paid to the proper application of them to the work. All good workmen are careful to have their callipers made with free working joints, kept well oiled, and so fitted as to move equally at all points; but it is not at all uncommon to find great, stiff, rough-jointed, thick-ended callipers, that will not move except with a jerk, and that are quite unreliable to do any work with. Moreover, too much pressure is applied to the tool, and it is often forced over a shaft to try the size. No conclusion can be arrived at in such cases, and the result is a misfit, or a half day's filing on the part of the finisher to correct the error of the turner.

Fig. 1



The callipers here illustrated are perfect. They are not fit for rough handling, but for nice workmen they are indispensable. They register the size the points open to, as may be seen by referring to the index over the joint, Fig. 1, and also indicate the degree to which the legs are sprung over the job, so that the workman can see at a glance whether he has made the work the right size or not, and just how much he is springing the legs apart. This end is achieved in the following manner: One of the legs is made separate from the body of the tool and is jointed to the same, as at A. The back of this independent leg is provided with a spring, B, and jaw, C, the latter fitting over a small crank, D. The shaft of this crank has the index finger, E, attached to it as shown in Fig. 1. It is easy to see, therefore, that when the legs are sprung over the work, the independent leg will act on the index needle, and cause it to move over the plate, thus showing the amount of variation from the true size, unerringly. This tool is on the same principle as the micrometer gage used in watch work, to

Fig. 2



measure with great nicety. The independent leg can be fastened at any time by the thumbscrew, F, so that it is an ordinary pair of callipers. This is one of the neatest as well as most substantial tools of its class that we have seen. The implement sent here was beautifully finished; if the inventor furnishes as handsome goods to the trade he will become famous.

Application for a patent pending through the Scientific American Patent Agency. For other information address Philo Soper, London, Canada West.

© 1866 SCIENTIFIC AMERICAN, INC.

THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

PUBLISHED WEEKLY AT

NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions for advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

☞ Messrs. Trübner & Co., 60 Paternoster Row, London, are also Agents for the SCIENTIFIC AMERICAN.

☞ "The American News Company," Agents, 121 Nassau street, New York.

VOL. XIV., No. 8..[NEW SERIES.]..*Twenty-first Year.*

NEW YORK, SATURDAY, FEBRUARY 17, 1866.

Contents:

(Illustrations are indicated by an asterisk.)

*Robbins's Apparatus for Preserving Wood	111, 112, 113, 114	Composition of Lucifer Matches	117
Farmers' Club	114	*Loveland's Dough Kneader	118
*Tracey's Improved Gang Saw Gage	114	The American Institute	118
Burning of Smoke	114	*Soper's Registering Micrometer Callipers	118
Official Report of the Cattle Plague	114	Report of the French Exhibition	119
*Kirk's Connecting Link	115	Prof. Mapes's Theory of the Progression of Primaries	119
The Photo-miniature—Beecher's Formula	115	Burnettizing Wood	119
Spider Silk	115	The Naval Race	119
*Green's Plows	115	Special Notices	119
Chloride of Lime for Vermin	115	Condition of the Patent Office	119
The New Cable	115	New Inventions	120
How to Make Mill Picks	116	Patent Office Decisions	120
Black Walnut Polish	116	Patent Claims....120, 12., 122,	123
Query for Molders	116	Notes and Queries	123
Latest Foreign Intelligence	116	*Gardner & Robertson's Automatic Stop Governor	126
A Watch Factory in Illinois	117	*Brooks's Kerosene Lamp Trimmer	126
The Russian Telegraph	117		
Alloys of Manganese	117		

THE circulation of the SCIENTIFIC AMERICAN has never been so large as now since the spring of 1861, at which time the war stopped our circulation in the Southern States. Subscriptions continue to come in very rapidly.

REPORT ON THE FRENCH EXHIBITION.

A committee, appointed by the New York Chamber of Commerce to consider the claims of the contemplated French Exhibition upon our countrymen, and to invite the attention of Chambers of Commerce and Boards of Trade, in other cities, to the peculiar national importance of the Exhibition, has prepared and published an elaborate and somewhat verbose report of its views of the whole subject.

The report contains a brief history of the origin of the Chamber of Commerce "in a petty seaport on the southern extremity of Manhattan Island," until now "it finds itself peacefully and broadly seated within a great commercial mart, including the Bay of New York, in a city the third in population of the Christian world." The figure is fine, but the Chamber of Commerce is narrowly seated in a small room on the corner of William and Cedar streets, and sometimes troubles itself with subjects which are entirely foreign to its purposes and organization.

However, the report before us, in spite of its redundancy of language, is, nevertheless, of considerable interest; but, like most other reports, it sweeps over so much space that we cannot find room for it in our journal.

We are glad that the Chamber has waked up to the interests of this proposed Exhibition, and we desire to call its attention to one point wherein it may render an immense service to those who propose to become exhibitors. The space allotted to the United States is 16,824 square feet, a space not quite equal to seven ordinary building lots in this city. No additional space in the exhibition building, as proposed to be constructed, can now be had, as it appears that other nations have applied for additional space which cannot be granted; therefore, in order to meet the wants of our countrymen, Mr. Beckwith, the agent in Paris, suggests that an additional building must be erected, and that Congress should provide $300,000 as a maximum of the expense. It is understood, however, that the Committee in Congress having the matter in charge, and of which Mr. Banks is Chairman, will report in favor of an appropriation of $50,000 for salaries, and $50,000 additional for other expenses, which will scarcely be adequate to install the space already appropriated by the Imperial Commission.

Now, if we are to profit freely as a nation by what the report designates "the great international solemnity," meaning the Exposition, a great deal more money will be required, and the Chamber of Commerce, so broadly seated in the third Christian city of the world, has the power and influence to make up the sum specified by Mr. Beckwith. Let the same committee, consisting of Messrs. Ruggles, Opdyke, Duer, Stranahan and Cowdin, take this matter in hand and reinforce the appropriation about to be made by Congress. If this is not done we shall make a poor show of our industrial forces in Paris, and the grand eloquent report of the committee will be razeed a good deal in its pretensions.

PROF. MAPES'S THEORY OF THE PROGRESSION OF PRIMARIES.

In geological investigations it has been ascertained that the first animals that were created on this earth were of very simple structure—a mere sac, like the clam or oyster, in fact, more simple even than they. Afterward, animals of more complex structure were created—such as sharks and other low orders of fishes; after these the first amphibians made their appearance; next in order came forth reptiles—the lowest form of land animals; after the reptiles mammalians were created; and last of all man—the most complex organism on the globe. Through immeasurable ages the animal creation advanced by progressive improvement "from the monad up to man."

The same progress took place in the vegetable creation. In the oldest fossiliferous rocks no remains of vegetables are found except those of exceedingly simple structure—sea weeds without flowers or other organs; while the upper and newer rocks are filled with plants of more complicated structure, constantly becoming more complex, till, in the present age, we have the modern tree, with its plumule and radicle, its trunk, branches, leaves, calyx, petals, pistils, stamens, anthers and pollen—a structure with numerous organs for its own growth and the propagation of its species.

Water is a compound substance, made up of other substances, oxygen and hydrogen, which can be separated. Iron, on the other hand, is a simple substance, which cannot be decomposed. There are about eighty simple or primary elements at present known, though only about twenty of these exist on the surface of this earth in any considerable quantity. Sixteen of the primary elements are used, by nature, in building up the structure of plants and animals—twelve being employed in minute quantities only, while the principal portion of all organized beings is formed of the four organic elements, oxygen, hydrogen, nitrogen and carbon.

Now, Prof. Mapes's theory was that these elements had, in the long ages of creation, gone through the same progressive improvement as the plants and animals which they combine to form. He contended that before carbon could enter into the structure of an oak or a lily, it must first pass through sea weeds, acrogens, cycads, and the other low and simple forms of vegetable life—being itself modified and improved with the general advance in the vegetable creation. He asserted that a rose could not be nourished with potash direct from the feldspar rock, but that the potash must first go through its series of progressive improvement in mosses and other low forms of vegetables.

This theory has received a great deal of ridicule; the only objection that we make to it is the absence of evidence in its support. Had Prof. Mapes devised and conducted an experiment which should have proved that a rose would not assimilate potash from feldspar, he would have been regarded as the author of a great discovery that would have made his name immortal; but the theory, without evidence, is to be ranked among the thousands of unsupported suggestions that are constantly coming from the teeming brains of mankind.

BURNETIZING WOOD.

A writer in the Boston *Recorder*, from Omaha City, describes a burnetizing apparatus in use in the construction of the Pacific Railroad, away out in Nebraska, which forcibly exhibits Western enterprise. Some of the railroad companies in this vicinity have adopted the same plan for rendering their cross-ties and bridge timber durable, but no plan is yet so generally in use as it should be. The invention of L. S. Robins, for accomplishing the same end, illustrated on another page, we recommend to the attention of railroad companies. The writer says:—

"First, there is a large saw mill on the bank of the river, working two saws, engaged in cutting ties and lumber. Second, a burnetizer; this is worked by a steam engine, and consists of a large iron cylinder 75 feet long, and 5 feet in diameter. The object of this is to harden soft and perishable timber, and render it durable. Cars holding 300 cross-ties are run at one time into the cylinder, the doors are closed, the air exhausted by a pump, and the cells of the wood are thus cleared of sap. Chloride of zinc is then allowed to follow up the vacuum, where it is forced into the pores of the wood by a force pump driven by steam. A large proportion of our timber is cotton-wood, and, if by this process it can be rendered durable, it will be of great advantage not only to the railroad company, but for many other purposes. This machine is capable of preparing 1,200 ties in 24 hours."

THE NAVAL RACE.

This highly exciting and most wonderful event is to come off very soon. Both vessels are ready and eager for the fray, with all their guns, stores, and other impediments on board. If the *Winooski* beats the *Algonquin*, Isherwood's theories are correct. If the *Algonquin* beats the *Winooski*, Dickerson's theories are correct. Engineers will govern themselves accordingly. If the *Winooski* triumphs, all the steam cylinders in the country must be bushed and some more boilers put in; if the *Algonquin* is victorious, the services of the Hanlon Brothers will be required.

The race is to begin from Sand's Point, a distance of 13 miles from this city, and is to be over Long Island Sound, around Faulkner's Island—in all a distance of 800 miles. All other vessels have been warned to give these coursers the right of way, but no stipulations have been made about Plum Gut.

SPECIAL NOTICES.

John M. Earls, of Troy, N. Y., has petitioned for the extension of a patent granted to him on the 21st day of April, 1852, for an improvement in smut machines.

Parties wishing to oppose the above extension must appear and show cause on the 9th day of April next, at 12 o'clock, M., when the petition will be heard.

Thomas J. Woolcocks and William Ostrander, of New York City, have petitioned for the extension of a patent granted to them on the 4th day of May, 1852, for an improvement in speaking tubes.

Parties wishing to oppose the above extension must appear and show cause on the 16th day of April next, at 12 o'clock, M., when the petition will be heard.

Condition of the Patent Office.

The business of the Patent Office increased so rapidly during the year 1865 that the examining force was insufficient to dispose of the cases as was desirable.

We have no doubt that Congress will soon pass a bill authorizing the Commissioner to increase the examining force, which will insure a more rapid disposition of the cases. In the meantime, the examiners are hard at work, and are bringing up the business with commendable dispatch.

THE AMERICAN INSTITUTE.—The election of officers of the American Institute for the ensuing year took place on Thursday evening, February 8, 1866. The following was the result of the ballot:—Horace Greeley elected President by twenty-five majority over Wm. Hall; Vice Presidents, Dudley S. Gregory, Edward Walker and Wm. Hibbard; Recording Secretary, Jirah Bull; Corresponding Secretaries, Samuel D. Tilman; Treasurer, Sylvester R. Comstock.

AN extraordinary fact in connection with the traffic of the East India railway is, that 90 per cent of the whole is third class, carried at the rate of three-eighths of a penny per mile.

© 1866 SCIENTIFIC AMERICAN, INC.

NEW INVENTIONS.

Coffin.—The object of this invention is to so construct a coffin that the bust and head of the body can be seen without bending over the coffin, as is necessary with coffins and burial cases as at present constructed. The invention consists in cutting out from one or both sides of a coffin, near the head part thereof, a portion of the sides of the coffin, deep enough to expose the bust and head of the body to a person looking toward the side of the coffin; and in securing pieces, corresponding to such cut-out pieces, to the lid of the coffin, so that, when the same is closed, the coffin will present the appearance of an ordinary coffin; and it consists in the combination with such coffin of a glass set in the lid thereof, which, when the lid is open, will rest over the plate on the coffin, and when closed will permit a view of the face of the corpse. Julian A. Fogg, of Salem, Mass., is the inventor.

Boring Machine.—This invention relates to a new and improved machine for boring blind slats, and also for boring articles for mortising, and any article which requires to be bored at certain distances apart, or for spacing articles for other purposes. The invention consists in a new and improved means for spacing or regulating the distance between the holes, so that the wood may be bored as accurately as may be required. This means consists of a scroll cam with a curved rack fitted therein, and arranged with a dog-toothed wheel and a sliding rack, whereby the stick or wood to be bored may, with the greatest facility, be adjusted or moved relatively with the auger or bit, so that the work may be done in an accurate and perfect manner. Josiah H. Gibbs, of Grand Rapids, Mich., is the inventor.

Grab.—The object of this invention is to facilitate the recovery of pipes, drills, reamers, and other tools, and other objects, from oil and other wells, and from other places difficult of access, and also to facilitate the raising or lifting of bodies from a lower to a higher elevation. It consists in a pair of jaws connected to a shank or sinker by means of links or straps, in such a way that the jaws are allowed a little motion, endwise, away from the shank when any weight is attached to them, as when they have grabbed any heavy object. Besides this connection, they are connected by a cam joint, which operates, when they are moving apart, to close the jaws and make them seize any object which is between them. The implement is also provided with adjustible guides, which enable the operator to center it and make it descend along the axial line of a well or other place where it is used, and also to make it descend in a diagonal or inclined position, so as, in the latter case, to seize any object which may be leaning against the walls of a well. D. F. Mellen, of 438 Fourth avenue, New York City, is the inventor.

Thread Cutter for Sewing Machines.—The object of this invention is to provide in the table of a sewing machine, or directly connected therewith, a means for cutting off the thread at the end of a seam by pushing the work forward. It consists in forming a cutting edge or a cutter on the under side of the table, which presents itself in or across the slot through which the needle works, so that when the loop is brought against it, the thread will be severed and be left in readiness for beginning a new seam. Henry W. Dennis and John Baker, of Hopkinton, Mass., are the inventors.

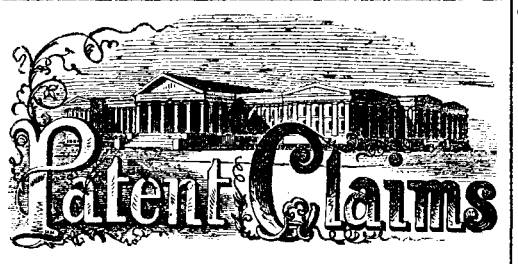
Machine for Polishing the Heels of Boots and Shoes.—This invention is designed to obviate a difficulty hitherto attending the polishing of boot and shoe heels on the last by machinery. This difficulty consists in keeping the bottoms of the heels in contact with the guard or test which preserves the edges of the heels, preventing them from being rounded or pressed out of shape under the action of the polishing wheel, said difficulty being caused by the last having its center of motion out of line with the center of the heel, or not at right angles therewith, the hole in the last which receives the stud of the rotating arm, being bored in front of the center of the heel and slightly inclined toward the toe, in order to prevent splitting. The invention consists in having the stud or studs which enter the last arranged in such a manner that they, and consequently the last, may rise and fall, and thereby compensate for the oblique attachment of the last to the rotating arm of the device. S. D. Tripp, of Lynn, Mass., is the inventor.

PATENT-OFFICE DECISIONS.

Application for patent for improvement in Bolt Blanks.

Elisha Foote for the Board.—The third section of the Patent Act of 1861 provides that no appeal shall be allowed to the Examiners-in-Chief, except in interference cases, until after the application shall have been twice rejected. The object of this provision was to give the party an opportunity to answer or explain the references on which the Examiner founded his decision, and to give the Examiner the benefit of such explanations and arguments before finally rejecting an application. In this case the first letters of the Examiner only suggested amendments of the specification which he deemed necessary to properly present the case for examination. They cannot be regarded as decisions upon the merits. Upon the case as amended and finally presented to the Examiner there has been but one rejection. The arguments that have been addressed to us and the explanations of the references given should have been addressed to the Examiner. Possibly they might have changed his decision. At all events there must be a second rejection before the case can be appealed.

The appeal in this case is consequently dismissed.



ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING FEBRUARY 6, 1866.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

52,377.—Pump.—W. A. Barnes, Decatur, Ill.:

First, I claim the combination and arrangement of the pump cylinder, A, and chamber, D, with the box, C, divided into two compartments, a a', which communicate respectively one with the cylinder, A, and the other with chamber, D, and provided at its ends with the boxes, E E'; which communicate with the compartments, a a', by means of the valves, F, substantially as described.

Second, As combined and arranged with the above, I claim the taper or conical flanges, G G', of the boxes, E E', for the purpose of facilitating the adjustment of the tubing or pipes to the pump, as set forth.

[This invention has for its object the attaching of tubing to submerged pumps with greater facility than hitherto, so that the pump may be placed at any point within the well, and the tubing attached both above and below, without any difficulty whatever. The invention has further for its object a novel arrangement of partitions and valves, whereby the pump will be rendered double acting, by an extremely simple means.]

52,378.—Cloth-measuring Machine.—James J. Benham, New London, Conn.:

First, I claim the two cylinders, B E, in combination with the dials, M N, ratchet, J, pawl, l, eccentric, G, and indexes, b f, all arranged substantially as and for the purpose set forth.

Second, The roller, R, and flat board, V, fitted in frames, O O, when arranged in relation to and used in combination with the cylinders, B E, substantially as and for the purpose specified.

[This invention relates to a new and improved machine for measuring cloths, carpeting, ribbons, and dry goods generally. The object of the invention is to obtain a device for the purpose specified which will be simple in construction, measure accurately and with rapidity.]

52,379.—Fruit Jar.—Edwin Bennett, Philadelphia, Pa.;

I claim a fruit-preserving vessel having its stopper, c, secured air tight by means of screw threads, c' c', acting in combination with an elastic band, D, secured around between the stopper and the inner sides of the mouth or neck of the vessel, substantially as described.

I also claim the use of a pierced, elastic plug, E, in combination with a stopper, C, substantially as and for the purpose described.

52,380.—Steam Gage.—Chas. Bourgeois, Buffalo, N. Y.:

I claim the combination of the lamp, D, with a steam gage and transparent index plate, B, and thereby internally light the gage, and make the figures of the index plate visible, substantially in the manner and for the purpose set.

52,381.—Boot-blacking Ottoman.—David B. Boynton, Boston, Mass.:

First, I claim the combination of the cam, M, with the foot rest, K, and with the ottoman, for raising and lowering said foot rest, substantially as described.

Second, The combination of the foot rest, K, cam, M, brush drawer, G, blacking receptacle, R, and scraper, V, with the ottoman, substantially as described and for the purposes set forth.

[The object of this invention is to furnish a convenient apparatus for blacking boots and shoes, and a convenient receptacle for the blacking implements, which, when closed, shall be, to all appearances, an ordinary ottoman, and it consists in combining with an ottoman the various articles necessary in cleaning and blacking boots and shoes.]

52,382.—Machine for Winding Cord into a Series of United Skeins.—Edward Brown, South Otselic, N. Y.:

First, I claim the arrangement of the fixed and movable standards, b and g, and connected gearing, together with the loop-end crank arms, d' and g', on and between which the skein is hung and cross wound, all operating together substantially in the manner described.

Second, The revolving box, t, having adjustable projecting arms, a' a', operating as and for the purpose specified.

52,383.—Wind Wheel.—Benj. F. Burnett and Thos. Vandevoort, Phelps, N. Y.:

First, We claim the balls, E E, or their equivalents, attached to the movable sections of the stationary sails, in combination with the spring, or its equivalent, for the purpose of regulating the revolving motion of wind wheels with stationary sails, the whole constructed and operating substantially in the manner and for the purpose above described.

Second, In an apparatus for utilizing the power of the wind by means of wind wheels, we claim the pitman, K, placed centrally in the post by which the wind wheel is supported, in combination with the lever, X, working through an aperture in the said post, substantially in the manner and for the purpose described.

Third, In an apparatus for utilizing the power of the wind by the use of a wind wheel, we claim the above-described mode of connecting the pitman, K, with the lever, X, that is to say, by passing the pitman through the lever and then, by means of a flange above and below the lever, enabling the wind wheel to revolve around on its vertical shaft and carrying with it the pitman, without interfering with the harmonious action of the machinery, substantially as above described.

Fourth, In an apparatus for utilizing the power of the wind by means of a wind wheel, we claim the combination of the lever, L, and the slide, m, constructed and operating substantially in the manner and for the purpose above set forth.

52,384.—Corn Harvester.—T. Butterworth, Shelbyville, Mo.:

First, I claim the combination of the obliquely-set knives with the reels revolving on the inclined shafts, and provided with the angular arms, as described.

Second, I claim the combination of the master wheel, F, tooth, m, toothed wheel, O n o, lever, Q, pawls, L, and ratchet M, for tripping the catcher to discharge its load, as described.

Third, I claim the armed catcher, K, in combination with the ratchet, M, triggers, L L, and lever or other equivalent tripping device, for the intermittent dropping of the gathered corn.

[This improvement relates to a machine drawn by an animal that walks between the rows of corn. The stalks are cut by stationary knives, so arranged on the machine as to come in contact with the corn as the machine progresses, the corn being drawn over toward the knives by revolving reels, and received upon arms which are tripped when bunches of sufficient size have accumulated, in order to properly deposit the bunches. The machine is designed to gather up the down and tangled stalks, and cut them off in a proper manner.]

52,385.—Mode of Detaching Tow Lines.—John H. Carr, Palo Alto, and Edward Andrews, Pottsville, Pa.:

We claim the combination and arrangement of the plates, A A, tow iron, C, lever, B, and spring, E, held together by the post, F, and pivots, 1 and 2, substantially as described

52,386.—Artificial Stone.—Antonis Caradey, Philadelphia, Pa.:

First, I claim an artificial stone made from gypsum by calcining the same and subjecting it to the action of a chemical bath, substantially as herein described.

Second, Imparting to the gypsum the appearance of veined marble or fancy stones, by introducing coloring matter into the bath, as set forth.

52,387.—Binding Guide for Sewing Machines.—Wm. J. Chaplin, Dowagiac, Mich.:

I claim the binder in one piece, cut from a single metallic plate and formed as set forth, in combination with the adjustable binding holder, the whole being adjustible on the bed plate of a sewing machine, substantially as described.

52,388.—Sash Fastening.—Chas. B. Clark, New Haven Conn.:

I claim the rack, B, and the arms, C C', provided with the rollers, D D, having their peripheries partially toothed, when said parts are used in combination with a single lever, E, arranged substantially as shown, to operate either arm, C or C', as set forth.

52,389.—Shank Laster.—Orrin R. Clark and Frelon H. Slyter, Marengo, Ill.:

I claim the handle or lever, A A, strap, C, jaws, D D, and eccentric, E, in combination, arranged and operated in the manner and for the purpose set forth.

52,390.—Skeleton Skirt.—Augustus J. Colby, New York City:

I claim a hoop skirt made of a series of springs arranged at a vertical inclination to the central vertical axis or direction of the length of the skirt, substantially in the manner described and for the purposes specified.

52,391.—Manufacture of Blacking.—G. W. Corey, Port Jervis, N. Y.:

I claim the composition for water-proof blacking made up of the ingredients in the manner and of the quantities as herein recited.

52,392.—Chain Hook or Cable Stopper.—Edward Davidson, Providence, R. I.:

I claim the construction of the swinging jaws, c c, of the chain hook with the holding cap or clasp, B, having a prong, f, arranged together substantially as and for the purpose described.

52,393.—Bolt-heading Machines.—L. L. Davis, Laconia, N. H.:

First, I claim constructing one or more grooves, channels, or dies in the upper faces of the standards, A and B, herein described, or either of them, for the purposes and in the manner substantially as set forth.

Second, The combination with the bolt-heading machine herein described of an adjusting scale, substantially as set forth.

52,394.—Boot Crimp.—Nathan Day, Ithaca, Ohio.

First, I claim the arrangement of the jointed and lipped crimping board, D E N N', and stretcher, J K L M, for the purpose set forth.

Second, The described combination of horse, A, jointed clamp, B C B' C', jointed crimping board, D E, loop, I, treadle, H, and pin, G, for the purpose explained.

52,395.—Harvesting Machine.—Nicholas A. Dederer, Greene, N. Y.:

First, I claim in a reaping machine an auxiliary wheel running upon the ground and swinging by an arm from a pivot, and communicating motion to an auxiliary driving shaft whenever the machine is moving directly to the front, and automatically disengaging itself from the shaft when the machine is being turned, by means of a clutch upon the end of the shaft, substantially as and for the purposes set forth.

Second, The combination of the wheel, B, with its attachments, C L and H, the clutch, D, and ratchet and pinion, E F, substantially as and for the purpose set forth.

52,396.—Harvester Rake.—Nicholas A. Dederer, Greene, N. Y.:

First, I claim the combination of the cams, L M, toggle, G, and pitman, H, with the vibrating rake arm, substantially as described.

Second, The combination of the vibrating rake, the slatted platform, and the compressing and dumping cradle, arranged and operating substantially in the manner described, for the purpose set forth.

Third, The combination of the sweep rake and dumping cradle with the hinged shield, substantially as and for the purpose described.

Fourth, The dumping cradle, arranged and operating as described.

52,397.—Artificial Fuel.—Alfred de Lentilhac, Tamaqua, Pa.:

I claim an artificial fuel composed of fine coal dust, vegetable gluten, and coal tar, pressed into bricks or blocks, dried, then placed in hermetically sealed iron boxes, and baked or coked in a hot oven, substantially as and for the purpose described.

52,398.—Thread Cutter for Sewing Machines.—Henry W. Dennis and John Baker, Hopkinton, Mass.:

I claim a stationary knife or cutter with its edge laying across the needle throat in the table of a sewing machine, so that it will intercept and sever the thread by simply pushing the work toward it, substantially as described.

52,399.—Chimney Holder and Fastening.—R. H. Dewey, Pittsfield, Mass.:

I claim the combination of the sliding hooks, f, with the ring or

© 1866 SCIENTIFIC AMERICAN, INC.

plate, n, arranged together and operating substantially in the manner described and for the purpose specified.

[This invention relates to a novel chimney holder for coal-oil and other lamps, the object of which is to enable the holder to be readily adjusted to the varying sizes of the chimneys.]

52,400.—Shoulder Brace.—F. Durand, Seymour, Conn.:

I claim as an improved article of manufacture the shoulder brace, h l m n o, constructed as herein specified, so as to be adapted for use either separately as a brace or connected by the lacing cord to a corset or bodice.

[This invention consists in making the bodice of such a length that when worn it shall not extend quite to the hips, and of such a form as to fit closely about the person, it being made smaller at the bottom than at the top, and laced behind and either buttoned or looped in front; and also in a peculiar manner of attaching shoulder straps or braces to the bodice, for the purpose of keeping the chest upright and expanded, the shoulders back, and the form erect, the importance of which, so far as regards health, is well known.]

52,401.—Gang Plow.—A. P. Durant, Atlanta, Ill.:

First, I claim uniting the two plows, M N, to a single beam, G, where said beam is arranged between the frame, C C', and hung on a pivot to the front end thereof, and forward of the axletree, substantially as shown and described.

Second, The two levers, S S', when united together in the manner described, and connected to the rear end of the plow beam, G, for the purpose of keeping said beam from twisting or the plows from slewing or creeling out of their proper path, and for the purpose of raising them out of the ground, as set forth.

52,402.—Evaporator.—John H. Elward, Polo, Ill.:

First, I claim the method described for boiling cane juice, by applying the heat at two levels in the liquid, substantially as set forth.

Second, The evaporating pan, constructed, arranged, and operating substantially in the manner set forth.

Third, The combination of the pan with the boiler, when constructed, arranged, and operating substantially in the manner described.

52,403.—Paper Clamp.—Adolph Faber, Washington, D. C.:

I claim as a new and improved clamp the combination of the open slides, s, with the inclined planes, a and b, or a alone, substantially as alleged.

52,404.—Rocking Chair and Fan.—George Fleig, Philadelphia, Pa.:

I claim the chair, a, the bow rod, E, the fan, F, and the chords or straps, c c' d d', arranged and operating substantially as herein specified and described.

52,405.—Coffin.—Julian A. Fogg, Salem Mass.:

First, I claim cutting out of a coffin, a portion of the sides at the head part thereof deep enough to exhibit the bust and head of the corpse substantially as specified.

Second, I claim the pieces, D, so arranged that they will close the space cut out at the sides of the coffin, substantially as described.

Third I claim the use in combination with a coffin so constructed of a glass, E set in the lid in such manner that when the lid is open, the inscription on the plate can be read, and that when the lid is closed the face of the body can be seen, substantially as specified.

52,406.—Locomotive.—W. N. Forney, Baltimore, Md.:

First, I claim the combination, and only the combination of a fuel-bin, or water tank with a depressed or inclined fire box in locomotives arranged and operating in the manner and for the purposes herein above substantially set forth.

Second, I claim the combination and only the combination of these three elements, first a locomotive having all the weight of the engine and boiler upon the driving wheels; second, a guiding or leading truck or tender for carrying the water or fuel, or both, or so much of them as is not carried as above shown, and third, a rigid frame connecting the locomotive and tender, all arranged and operating substantially as above set forth.

52,407.—Plows.—Joseph Fowler, Rahway, N. J.:

I claim the plate, c, extending from the beam to the blade, d, in combination with the movable or adjustable mold board, f, attached to said plate, c, at any desired height, as and for the purposes set forth.

52,408.—Washing Machine.—Titus D. Gail, of Newport, Ill.:

I claim the rotating and revolving corrugated cones journaled at their apexes by the headed pins in receded slots in the post and at their bases in pivoted links as described in combination with the corrugated bed, the whole being arranged and operated substantially as described and represented.

52,409.—Machine for Boring Blinds.—Josiah H. Gibbs, Grand Rapids, Mich.:

I claim the cam, P, formed of a spiral groove made in the side of a wheel, in connection with the rack, Q, fitted in said groove, the toothed wheel, N, arm, R, connected with the rack, Q, and the sliding rack, M, all arranged in connection with an auger or bit or other tool to operate in the manner substantially as and for the purpose set forth.

52,410.—Coupling.—J. Harris, Green Lake, Wis.:

I claim the link, B, attached to the drawhead, A, in connection with the drop or coupling pins, foot lever or treadle, E, and catch bar, H, all arranged and combined to operate substantially in the manner as and for the purposes herein set forth.

52,411.—Lightning Rod.—Louis J. Hawley, Baltimore, Md.:

I claim the lightning rod constructed as described and represented, consisting of a central copper strip, inclosed between lap joints, iron side pieces the points of connection being provided with interposed zinc plates.

I also claim the supplementary conductor formed by the points of the prolonged wire band, D D, as described and represented.

52,412.—Camp Stool.—Charles G. Herbert, New York City:

I claim the extension legs formed of pipes containing sliding rods or tubes in combination with the cross bar, that connects the legs and keeps them extended, as and for the purposes set forth, and in combination with such legs and cross bar, I claim the cross rails and seat fitted substantially as specified.

52,413.—Corn Planter.—Thomas M. Hill, Eaton, Ohio:

First, I claim the described arrangement of the hinged arms, H H, and the spring lever, O, which latter operates the slides in the seeder, substantially as described.

Second, The arrangment of the slides. P Q R, lever, O, and cylinder, K, operating substantially as described and represented.

52,414.—Elastic Shield for Trunks.—J. A. and H. A. House, Bridgeport, Conn.

We claim the vulcanized rubber or gutta-percha, package guard above described, constructed and operating substantially in the manner set forth.

52,415.—Bolt Screwing and Nut Tapping Machine.—William W. Hubbard, Philadelphia, Pa.:

First, I claim the revolving plate, F, with its rotating spindles, L L', in combination with the within described cutting and feeding devices or their equivalents, the whole operating substantially as specified.

Second, I claim the carriers, N, with their jaws, m m, in combination with the cam, p, lever, Q, and plate, R, the whole being arranged and operating substantially as and for the purposes described.

Third, I claim the cam plate T, and its weight, q, or its equivalent in combination with the revolving plate, F, and its carriers, N N',

52,416.—Reclining Chair.—George Hunzinger, New York City:

First, I claim the cross bar, e, at the junction of the seat and back in combination with the folding or X legs, the ends of said cross bar, occuping grooves or mortises in said legs, as and for the purposes specified.

Second, I claim the arms, k, in combination with the folding X legs, c and d, and the back frame, h, said arms extending from the upper ends of the legs, d, to the back frame, h, substantially as and for the purposes set forth.

52,417.—Billiard Register.—R. H. Ingersoll, Washington, D. C.:

First, I claim the combination of the claw, H, wheel, I, and pronged plate, K, as and for the purpose described.

Second, I claim the combination of the pronged plate, K, rack, L, pinion, M, and figured dial, O, operating as described.

Third, I claim the combination of the spring slide, u, pawls, V V, wheels, I I, and springs, W W, substantially as described and represented.

Fourth, I claim the lever, Y, in its combination with the arms. f f, wheels, I I, and pawl, Z.

Fifth, I claim the described combination of the wheels, I I, lug, K notch, j, incline, g, and pin, h.

Sixth, I claim the slide, N, spring, p, prong, e, lever, Y, and arms, f f, operating substantially as described and represented.

52,418.—Method of Printing on Glass, Porcelain, Etc.—Ebenezer C. Jayne, Philadelphia, Pa.:

First, I claim transferring letters or other characters, from a sheet of printed or painted paper, other material superimposed upon glass or porcelain or other material, directly to the surface of said glass or other material, by a rubbing or rolling pressure applied progressively in lines singly or in a series, circular, straight or otherwise, or in one or more continuous line or lines, spiral or otherwise, in such manner and so close one line to another, as to force consecutively, every portion of the painted or printed character in close contact with said glass, porcelain or other material.

Second, In the process or operation of transferring by pressure, printed or painted characters from sheets of paper or other material to the surface of glass, porcelain or other material, I claim the employment of a yielding presser, or a series of yielding pressers in combination with a yielding bed, substantially as set forth.

Third, I claim a holding device, substantially as and for the purpose set forth.

Fourth, I claim the combination of a revolving shaft or spindle, F, screw rod, m, guide bar, l, and clutch, operating substantially as described.

Fifth, I claim a pressing device, in which one or more yielding pins or rollers are used, substantially as described.

Sixth, I claim the combination of a revolving shaft, F, screw rod, m, guide bar, l, and a clutch, with a pressing device and a holding device, substantially as described.

52,419.—Tobacco Pipe.—Paul Jeanne, Brooklyn, N. Y.:

I claim a tobacco pipe of any material or form made in two parts hinged together at the bottom of the bowl and secured by bands at its top and heel, the seam being made, smoke and air tight by packing, the whole being constructed substantially as described and for the purposes set forth.

[The object of this invention is to furnish a pipe which may be readily and thoroughly cleaned and as often as desired, and it consists in packing the seam of the hinged parts of the bowl with cork or its equivalent, so as to make the bowl smoke and air tight.]

52,420.—Caster for Furniture.—Thos. M. Kane and Conrad Brown, Goshen, N. Y.:

We claim the construction of the divided cylinder, B, with springs, C, when constructed, arranged and combined as herein described, and for the purposes set forth.

52,421.—Cultivator.—Alford Lamb, Skaneateles, N. Y.:

First, The arrangement for attaching the shafts to the beam by means of the swivel, F, and gage, G, for regulating the depth of the cut as set forth.

Second, The arrangement of the frame, E D C, and standards, A B H, with the frame, k, and handles, all constructed and combined substantially as and for the purposes set forth.

52,422.—Wheel and Axle.—Thomas A. Lane, Cincinnati, Ohio:

First. A carriage wheel provided with curved and elastic metallic spokes, D, substantially as described rigidly united to a spindle or shaft to be coupled to, but to revolve independently of the shaft of the corresponding wheel.

Second. A wheel whose spokes consist of yielding metallic plates, coinciding in form with a circular or other simple arc.

52,423.—Clothes Wringer.—Joel Lee, Galesburg, Ill.:

I claim the arrangement of levers, B B, hooks and links, G G, follower, F, guides and bearings, H H, with the pinion, E, the crown wheels, G G, and rubber rolls, C C.

52,424.—Manufacture of Sugar.—T. Lespes, Cold Spring, N. Y.:

First, I claim the within-described process of extracting the juice from cane or other plants containing sugar, by cutting the same up into short pieces and boiling these pieces, in suitable macerators, substantially in the manner and for the purpose set forth.

Second, Using the pieces of cane during the macerating process as filtering medium, as and for the purpose described.

Third, The tilting trough, F, in combination with the car, d, macerators, H, and elevator, E, constructed and operating substantially as and for the purpose set forth.

Fourth, The pans, I O, made entirely of wood, and provided with inclined troughs, J, substantially as and for the purpose described.

Fifth, The curved pipes, L L', in combination with the pans, I O, and their inclined troughs, J, constructed and operating substantially as and for the purpose set forth.

Sixth, The decolorizing column, N, constructed and operating substantially as and for the purpose described.

52,425.—Well Borer.—Russell R. Lewis, New York City:

First. Automatically controlling the bite of the borer by the gravity of the tube when acting by an intermittent blow, substantially in the manner described.

Second, The cam plates or ratchet teeth on the top of the reamer and the bottom of the tube, substantially as and for the purpose set forth.

52,426.—Spring Bed Bottom.—Thomas Linfoot, Cincinnati, Ohio:

I claim the arrangement of dovetailed rails, A a A' a, cross slats, D, helical springs, E, sliding head, F, and helical springs, G, in the described combination with the slats, I, whose ends occupy mortises in the rail, B, and sliding head, F, respectively as set forth.

52,427.—Hoop Skirt.—Leon Lobenstein, New York City:

I claim a skeleton skirt for ladies, formed with wire or chain connections, between the springs or loops of the skirt, as and for the purposes set forth.

52,428.—Potato Digger.—Albert Marcellus, Pittsford, N. Y.:

First, I claim the ground wheels, G, of potato diggers, when constructed substantially as and for the purposes set forth.

Second, The combination of the ground wheels, G, with the double mold board plow, B, they being so arranged, relatively, that the wheels shall receive the furrows from the plow, and for the purposes set forth

52,429.—Cultivator.—A. S. Markham, Bushwell, Ill.:

I claim the securing of the pendants, J, on the rod, K, by means of bolts, i, passing through any of a series of holes in plates, N N, attached to the draught pole, substantially as shown and described.

[This invention relates to a new and improved cultivator of that class designed for cultivating crops grown in hills or drills, and in a novel arrangement of parts whereby the adjusting or removing of the plows are placed under the complete control of the operator, and the plows rendered capable of being operated with the greatest facility.]

52,430.—Heel Cutter.—Oliver H. and John A. Marston, Center Sandwich, N. Y.:

We claim the arrangement of the knife, I, on the movable carrier, H, with the cutting edge of the knife, placed in a straight line with the axis of the heel rest post, B, and the journal, b, on which the carrier turns, the same insuring to the knife during its passage around the heel rest the best working positions for cutting the heel or leather to conform to the same.

We also claim the arrangement of the elastic or rubber belt, F, the lever, D, the carrier, H, the knife, I, the heel rest, A, and its post, B.

We also claim the combination and arrangement of the annulus, E, with the heel-rest post, B, and the rubber or elastic band, F, applied to the lever, D, supporting the knife carrier, H, to operate with the heel rest, A, as specified.

52,431.—Pump.—Sylvester G. Mason and Calvin B. Gill, Rochester, N. Y.:

We claim the combination of the piston, consisting of the rim, d, chamber, f, and partitions, g g, and the valve consisting of the hollow axis or bearing, i, and wings, k k, operating substantially in the manner and for the purpose herein set forth.

We also claim the special construction of the piston, consisting of the rim, d, chamber, f, and inclined partitions, g g, arranged and operating substantially as described.

We also claim a piston having partitions, g g, situated respectively on opposite sides, and inclining in opposite directions, with induction ports, h h', in the opposite angles, above and below, for the purpose of admitting water at the opposite strokes, and balancing the piston, substantially as described.

We also claim the special construction of the valve consisting of the hollow axis or bearing, i, and wings, k k, and provided with the induction ports, l l', substantially as and for the purpose set forth.

We also claim securing the valve, D, in its chamber, f, by providing the removable bottom, G, with the dovetailed edges, m m, fitting in corresponding notches, n n, of the rim, as herein specified.

52,432.—Machine for Making Paper Boxes.—Charles A. Maxfield, New York City:

First, I claim mounting the box supporter, h, in the sliding pipe sustained in the swinging frame, b, for the purpose of allowing the box to be placed upon or removed from the supporter, h, substantially as specified.

Second, I claim the folding guide, 4, in combination with the supporter, h, rollers r and q, for the purpose and as specified.

Third, I claim the roller, 12, and guide or folder, 8, in combination with the box supporter, h, and roller, r, substantially as and for the purposes set forth.

52,433.—Bolt-heading Machine.—John W. McDermott, New York City:

First, I claim the combination of the jaws, P', or their equivalent with the dies, D, and the stop or pin, D', substantially as described and for the purpose set forth.

Second, The combination of the pawl, A', and ratchet wheel, b, with the wheel, S, cog-wheels, B' C' L and K, and shaft, M, and the die wheel, C, substantially as described, for the purpose of giving intermittent rotary motion to the wheels, C and T.

Third, The combination of the lever, I, with the cam-like projection, J', and the wheel, T, for the purpose of expelling the headed bolts from the bolt holder, E', substantially as described.

Fourth, The combination of the spring, R, with the jaws, P', and the dies, D, substantially as described and for the purpose set forth.

Fifth, The combination of the jaws, P', or their equivalent, with the dies, D, and bolt holders, E', for the purpose of centering the heads of the bolts, substantially as described.

Sixth, The combination of the sliding frame, I, the die wheel, C, and the crank, S', formed on the shaft, B, of the driving wheel, A, as set forth.

52,434.—Sawing Machine.—Andrew McFarland, St. Johnsbury, Vt.:

I claim the inclined elevator, W, with its pin, i, and spring, X, constructed and arranged substantially as described, in combination with the saw beam, E, and the pin, h, or its equivalent, on the side thereof, for the purpose herein set forth.

I also claim the arrangement and combination of the catch notch, e, and stop, d, or their equivalents, for holding up the pulley frame, H, connected by means of the spring levers, a b, or their equivalents with the log carriage in such a manner that the log will, at the proper time, automatically release the pulley frame, and allow it to descend with the saw, as herein specified.

I also claim the notch, V, or its equivalent in the upper edge of the saw beam, in combination with the pin, slotted girt, L, connecting bar, J, vibrating lever, M, feed arm, N, and ratchet wheel, O, on the shaft, P', of the winding-up pulley, substantially as described, whereby the log carriage is drawn along by the reciprocations of the saw beam, when elevated, substantially as herein set forth.

I also claim the roller, k, inclined or tapering outward, and arranged in the frame lower than the roller, m, substantially as and for the purpose herein set forth.

52,435.—Machine for Varnishing and Lining Percussion Caps.—Wm. A. McIntyre, Troy, N. Y.:

First, I claim the employment of the punch, D, cutter plate, E, and feed rollers, F F', all arranged and actuated by the means and in the manner, substantially as herein described, in combination with a feeding device, J, as herein shown, or any other equivalent device for that purpose, and operating in connection with the same for the purpose of lining percussion caps with tin foil or its substitute, in manner as herein set forth.

Second, In combination with a machine for lining percussion caps with tin foil or its substitute, I claim the employment of a varnishing apparatus, the said apparatus being constructed and operating together with said lining machine, so as to automatically and consecutively varnish and line the said caps, in manner substantially as herein described.

52,436.—Refrigerator.—James McKelvey, Buffalo, N.Y.:

First, I claim the combination with the case, A, and ice chambers, c c, of the openings, a' and a2, the latter being located so as to cause the air from the ice chambers to pass first to the center of the chamber containing the article to be kept cool, and be then diffused throughout the same, as described.

Second, The combination of the case, A, ice chambers, C, discharge pipes, e, troughs, d, and wires, D, the whole being constructed and arranged to operate in the manner and for the purpose herein set forth.

52,437.—Grab for Oil and other Wells.—Dustin F. Mellen, New York City:

First, I claim in implements for seizing and raising tubing, drills and other articles from oil wells and other places, the use of adjustable bolts, E, for guiding the implement in a vertical or in an angular direction, substantially as and for the purpose set forth.

Second, I also claim in combination the grab, A, having angular arms, B B, above the pivot of its jaws, the legs, G G, and the cam, C, on the shank of the implement, substantially as and for the purpose set forth, so that the grab is opened by means of the legs, G, when the angular arms are rising between the legs, G, and the cam, and closed when the arms are descending.

Third, I also claim the slotted straps, F, in combination with the jaws of the grab, substantially as shown and described.

52,438.—Eave Trough.—Thomas C. Moore, Marion, Ind.:

I claim the combination in an eaves trough of a finished cornice, A B, on one side, and a guard sheet, D, on the other, when both are made of continuous metal, and the guard sheet is placed upon the sheeting of the roof, its upper edge covered by the shingles or tiles, and the cornice side is secured substantially as described, for the purpose of having an ornamental eaves trough.

52,439.—Whip Socket.—Charles B. Morehouse, Newcastle, Ind.:

I claim the screw penetrating the ring from the outside, and the construction of the rings and their clamps, in combination with their metal bottom and elastic top, as herein described and for the purposes set forth.

52,440.—Carriage Clip.—Francis B. Morse, Milwaukee, Wis.:

First, I claim a carriage clip constructed substantially as described and for the purpose set forth.

Second, The combination of the anti rattler, J, with the bolt, H, and with the clip, substantially as describe dand for the purpose set forth.

[The object of this invention is to couple the thills or poles to the axle of a carriage securely, and in such a way as to avoid rattling, and which shall at the same time be neater in appearance, less liable to get out of order, and require less metal than the carriage clips commonly in use; and it consists in forming the clip with a chamber, in which is placed an anti-rattler, one end of which presses against the connecting bolt, and which is held up to its work, and the wear of the parts counteracted by a rubber spring carefully protected from the weather.]

52,441.—Washing Machine and Wringer.—Wm. H. Nichols, Chatham, Conn.:

I claim the rollers, C C', provided with cog wheels, b b', in their axles, in combination with an adjustable lever, F, which is provided with cog wheels, c c', intended to operate in connection with the cog wheels, b b', substantially in the manner and for the purpose set forth.

[This invention consists in the arrangement of two corrugated or rough-surface rollers, in combination with four cog wheels of differ-

© 1866 SCIENTIFIC AMERICAN, INC.

ent diameters, two of which are mounted on the axis of the rollers, and two on studs secured in an adjustable lever in such a manner that when the lever is made to close up toward the rollers said rollers are geared together by the intermediate cog wheels mounted on the lever, and one roller is made to revolve considerably further than the other, thereby producing a rubbing as well as a squeezing action on clothes pas ing through between them; and, by turning said lever back, the two rollers are thrown out of gear with each other, and in this state they serve simply as pressing rollers or wringers.]

52,442.—Blind Fastening.—Charles A. Palmer, Newburgh, N. Y.:

I claim the combination with the hook-fastening catch, a, of a window blind, of the holding plates, f and h, or their equivalents, inserted within the window sill, under the sash frame, and arranged and operating substantially in the manner described and for the purpose specified.

[This invention consists in inserting within that portion of the sill of the window frame against which the lower rail of the sash frame comes in contact when the window is shut, and below its surface, a staple of such a shape for the hook upon the blind to interlock wi h, that, when the blind is closed and its hook fastening interlocked therewith, and the window closed and locked, it will be impossible to unfasten the blind except the window be first unlocked and sufficiently raised to allow the hook to be disengaged from said staple.]

52,443.—Brad-awl Handle.—Henry L. Parker, Hartford, Conn.:

I claim forming a slit, i, across the shank, a', in combination with the latch, n, and handle, a, substantially as and for the purpose described.

52,444.—Ratchet Wrench.—William Pirsson, Newark, N. J.:

First, In combination with the ratchet and pawl arranged in a cavity in one side of the stock, I claim the lip on the pawl, substantially as and for the purpose herein specified.

Second, The stop, a, in the ratchet socket, substantially as and for the purpose herein specified.

52,445.—Seeding Machine.—John B. Pitts, Salem, Ind.:

First, I claim the arrangement and combination of the hopper, D, rotating seed-dropper cylinder, C, supporting and driving drum, B, and the gang of plows, the latter being applied to the frame, A, in rear of the roller, B, and the whole operating substantially as described.

52,446.—Pump.—Hearan Reed, New York City:

I claim a new article of manufacture, consisting of a pump, comprising the water chamber, A A, as shown, the two-pump cylinder, K K, secured and arranged within said chamber, as shown, and the air chamber, H, made, arranged, and secured over said water chamber and said pump cylinders, as shown and described.

52,447.—Forging Apparatus.—Alfred Rix, San Francisco, Cal.:

First, I claim connecting the handle of the hammer to the arm, or its equivalent, and so adjusting the length of said handle and arranging the several parts, that the hammer, when retracted, shall rest upon a support fixed upon the opposite end or intermediate portion of the arm, or its equivalent, which lies within or nearly within the plane projected, of the axis of movement of the hammer, and the axis of rotation of the arm, substantially as described.

Second, I claim the guide, D, constructed and used, substantially in the manner and for the purpose specified.

[An illustration and description of this invention was published in No. 10, Vol. XIII., Scientific American.]

52,448.—Packing for Deep Wells.—John H. Robinson and David A. Strong, Washington, D. C.:

First, We claim the tubes, B and E, forming a telescopic joint in combination with the flexible packing, substantially as described.

Second, In combination with a telescopic joint, the conical enlargement, A, slots, F, and screws or pins, D, substantially as described.

Third, The cone, A, and flexible packing, G, arranged and operating substantially as described, forming a packing both for the well and the tube.

52,449.—Meat and Vegetable Chopping Machine.—H. W. Russell, Stongleton, Mass.:

I claim the arrangement of the gear wheel, R, shaft, D, crank, E, pitman, F, reciprocating knife, I, in combination with the pinion, N, shaft, S, rotating plate, L, and vessel, K, operated from the same driving wheel, P, in the manner as herein described.

[The object of this invention is to provide a chopping machine for family use. It consists, in general terms, in a vertically reciprocating knife, which works through the cover of a vessel which has rotary motion in a horizontal plane. The same power which drives the knife gives rotary motion to the vessel; the latter contains the meat or vegetables to be cut, and as it revolves its contents are exposed at a different place to the action of the knife, which always descends in the same plane.]

52,450.—Process for Hardening Files.—John Russell, Sing Sing, N. Y.:

I claim passing a galvanic current through or into the solution in which files or other articles of steel are to be hardened, substantially as and for the purpose described.

52,451.—Suspended.

52,552.—Steam Gage Cock.—John C. Schaefer, Philadelphia, Pa.:

I claim the packing valve, C, the shank, l, and the socket, o, in the stem, n, substantially as herein specified and described.

52,453.—Ruler.—G. W. Schramm, New York City:

I claim a ruler formed by the union of two substances, one flexible and elastic, and the other flexible, or one more flexible and elastic than the other, such as the substances well known as hard and soft vulcanized india-rubber, substantially as and for the purpose specified.

52,454.—Lubricating Vertical Shaft.—John F. Schuffenecker, St. Louis, Mo.:

First, I claim an upright permanent toe, l, nuts, m m, key, p, and the pan, k, with the oil hole or slot, l, and cup, j, as shown, and for the purpose herein described.

Second, oiling the pan and toe from above by the lubricator, A, tube, i, with the vent hole, d, shutter, c, secured by the screw, a, and nut, b, or its equivalent.

52,455.—Connecting-rod Joint.—Thomas Shaw, Philadelphia, Pa.:

I claim constructing connecting-rod joints in the manner described.

52,456.—Amalgamating Gold and Silver.—George B. Simpson, Washington, D. C.:

First, I claim the rotating closed vessel, A, in combination with the interior coil, C, or its equivalent.

Second, I claim the vessel, A, with removable end, E, and interior coil, C.

Third, The closed vessel, A, in combination with suitable devices for lifting the same, to and from the fire, substantially as described.

Fourth, The amalgamation of gold and other precious metals, by immersing finely pulverized ore in heated mercury by means of a rotating vessel and internal agitator or stirrer, substantially as described.

52,457.—Gas-jet Cigar Lighter.—George B. Snow and Theodore G. Lewis, Buffalo, N. Y. Ante-dated Jan. 22, 1866:

First, I claim the arrangement and combination of the inclined valve chamber with the gravitating valve, when operating in the manner and for the purposes set forth.

Second, The adjusting screw, e, arranged and operating in the manner and for the purposes substantially as described.

Third, The opening and closing hood or shield, G, operating in the manner and for the purposes substantially as described.

52,458.—Horse Rake.—Thomas Stewart, Pittsburgh, Pa.:

First, I claim the sliding rods, Q Q', one or both, provided with lips, d d', at their outer ends, and connected at their inner ends to a lever, R, and also connected to the hinged frame, H, to which the rake teeth, J, are attached, and all arranged to operate substantially as and for the purpose set forth.

Second, The combination of the rake teeth, J, with the hinged frame, H, and fingers, F, all arranged to operate substantially as for the purpose herein specified.

[This invention relates to a mode of raising the rake so that it may discharge its load. The rake is of that class which is constructed of wire teeth, and it is arranged in such a manner as to be varied by the wheels. The invention also relates to a novel arrangement of the rake, and cleans or discharges, whereby the proper discharge of the load from the rake is insured.]

52,459.—Water Motor.—Henry B. Stiles, New Haven, Conn.:

I claim the combination of two or more valves, L, with their cams, N, when constructed and arranged to operate within a cylinder, substantially as and for the purpose specified.

52,460.—Pipe Damper.—William W. St. John, St. Louis, Mo.:

First, I claim the combination of the segmental plates, A A, with the end pieces, B B, the plates, C C, and the scraper, D, as and for the purpose set forth.

Second, I claim the scraper, D, for the purpose of removing the accumulated soot from a stovepipe damper.

52,461.—Graduated Bottle.—George W. Stoeckel, Pittsburgh, Pa.:

I claim a molded or pressed graduated bottle made substantially as herein described.

52,462.—Corn Cultivator.—Joseph S. Stukey, Sugar Grove, Ohio:

I claim the combination and arrangement of the plows or cultivators, cross bar, axle and frame when made adjustable, as and for the purposes set forth.

52,463.—Mode of Sinking Wells.—James Suggett, Cortland, N. Y.:

First, I claim the armor cap, c, with shoulder, H, and thimble, d, for the purpose described.

Second, In combination with cap, c, thimble, d, and shoulder, H, I claim the pump tube, a, for the purpose of driving said tube directly into the earth, substantially as set forth.

52,464.—Process for Preparing and Tanning Hides.—B. F. Taber, Buffalo, N. Y.:

First, In the process of preparing hides, I claim the use of aqua calcis, or in a solution of lime in water, as a soak for hides preparatory to liming or sweating, or both.

Second, I claim the use of heated water for sweating hides either in connection with or without liming, or in connection with the use of aqua calcis.

Third, I claim the use of heated water administered to hides while in motion in a drum or cylinder, for the purpose of removing the hair, cleansing them from lime, etc.

Fourth, I claim baiting (or abating) the lime from hides by the use of warm water and fowl dung, or other articles used as a bait administered to them while in motion in a drum or cylinder.

Fifth, I claim the use of aqua calcis (or a solution of lime in water), as a soak for hides, after they have been otherwise prepared for the tan.

52,465.—Putting up Caustic Alkali.—T. Chalkley Taylor, Philadelphia, Pa. Antedated Jan. 26, 1866:

I claim the putting up of caustic soda or potassa in cases which are originally left open at both ends and afterward closed by cement, substantially in the manner above described.

52,466.—Putting Up and Preserving Caustic Potassa and Soda.—T. Chalkley Taylor, Philadelphia, Pa. Antedated Jan. 26, 1866:

I claim the above-described method of filling a case with caustic soda or potassa, in such a manner as to avoid the danger of melting the solder which holds the case together and thus securing the box from injury.

52,467.—Churn.—Daniel E. Teal, Norwich, N. Y.:

I claim the arrangement by which the milk or cream is made to perform a circuit through different apartments and through screens, as described, by which all parts of the milk or cream are agitated and subjected to the necessary amount of friction, and brought into contact with the atmosphere at each circuit of the milk or cream. The screen keeping the butter first formed from passing through the churn unnecessarily.

52,468.—Canteen and Lunch Box.—Kathrin Thoman, Cleveland, Ohio:

I claim the arrangement of the chamber, D, with its cover and the recessor depression, A', in combination with the heater or case, A, and screw, C, constructed as and for the purposes set forth.

52,469.—Door Fastener.—George E. Thompson, New Haven, Conn.:

I claim the combination of the notched plates, A B and C, with the vibrating bar, D, all constructed and arranged substantially in the manner and for the purpose set forth.

52,470.—Heel-polishing Machine.—S. D. Tripp, Lynn, Mass.:

I claim the attaching of the stud, i, which enter the hole or holes in the last, A*, to a sleeve, g, connected to a pendent or swinging plate, G, all arranged in such a manner as to admit of the last, and consequently the heel of the boot or shoe rising or falling to admit of the proper adjustment of the heel to the polishing wheel and guard or rest, substantially as herein shown and described.

I further claim the springs, e e, attached to the shaft, F, in combination with the pendent or swinging plate, G, substantially as and for the purpose specified.

I further claim the combination of the shaft, F, pendent or swinging plate, G, sleeve, g, studs, i i', polishing wheel, D, and guard or rest, E, substantially as and for the purpose set forth.

52,471.—Corn Planter.—A. J. Van Boekel, Uniontown, N. J.:

I claim the attachment to and combination with a common plow of an additional plow share and mold board in front of the plow share and mold board of the plow, as commonly used, and an intervening corn-dropping mechanism, the mold boards being reversed or faced toward each other, and their line of travel being such that the wings of the mold boards are nearly in line with each other, so that the furrow turned by the front or attached share and mold board is immediately turned back by the plow share and mold board, thereby covering the corn dropped behind the furrow opener, the whole constructed and arranged substantially as hereinbefore described.

52,472.—Peat Machine.—T. J. Wells, New York City:

First, I claim mashing and grinding peat and breaking up its air and water cells between smooth cylinders whose peripheries move at different velocities, substantially as described.

Second, I also claim the cylinders, H H', whose peripheries are made to move at different velocities in combination with a series of fixed or revolving knives or both, for breaking up crude peat before it is delivered to the action of said cylinders, substantially as described and shown.

Third, I also claim the cylinders, H H', whose peripheries move at different velocities in combination with a series of fixed or revolving knives or both, and with an elevating apparatus for delivering crude peat to the action of the knives and of the cylinders, substantially as shown.

Fourth, I also claim cylinders, H H', constructed and operating substantially as described, in combination with the molding cylinders, E E, substantially as above described.

Fifth, I also claim in combination the cylinder, G, armed with knives or arms, as described, the hopper, D, above it, and the cylinders, H H', substantially as described.

Sixth, I also claim mixing coal dust or other fire-concentrated combustible material with crude peat while its lumps are being broken up by means of a hopper, D, for containing such coal dust or other material, and of a system of revolving knives or arms below the hopper, substantially as described.

52,473.—Blind Splint Machine.—J. A. Welsh, Xenia, Ohio:

First, I claim the sliding block, E, provided with the roller, e, arranged and operating as shown and described.

Second, the spring, a, and set screw, b, in combination with the movable block, E, and roller, c, arranged and operating in the manner and for the purpose set forth.

52,474.—Steam Engine.—Norman W. Wheeler, Brooklyn, N. Y.:

I claim the combination of two vertical or nearly vertical working cylinders, a a, with a connecting entablature, c c, in such manner that the cylinders and entablature will constitute the principal frame of the engine, when so arranged that the upper cylinder heads, d d, will pass into their places through the entablature, substantially as and for the purposes described.

52,475.—Valve Gear for Steam Engines.—Norman W. Wheeler, Brooklyn, N. Y.:

I claim the combination of the eccentric, b, cheek pieces, c c, pin, d d, and clutch, g, or their mechanical equivalents, constructed and combined with the main shaft and together, substantially as and for the purpose described.

52,476.—Still for Distilling Salt Water.—Norman W. Wheeler, Brooklyn, N. Y. Antedated Dec. 26, 1865:

First, I claim the combination of the vessel, a, steam jacket, b b, trap, g, and sea cock, Y, or their equivalents, substantially as described.

Second, I claim the combination of the valve, n, vessel, a, jacket, b b, and sea cock, V, or their equivalents, substantially as described.

Third, I claim the combination of the cooling jacket, 7, or its equivalent, upon the pipe, e e, in combination with an automatic still, substantially as described.

52,477.—Method of Delivering Liquid Gases.—Norman W. Wheeler, Brooklyn, N. Y.:

I claim relieving liquids of free gases or air, while they are under pressure, by means of the liquid trap, f, or its equivalent, when the trap is combined with the pump, c, substantially as and for the purposes described.

52,478.—Saw Rebate Plane.—Daniel D. Whitker, Hudson, N. Y.:

I claim combining and arranging the adjustable saw, A, with the adjustable gage rest, C, substantially in the manner and for the purpose herein set forth.

52,479.—Nail Machine.—Wm. Wickersham, Boston, Mass.:

First, I claim placing some of the cutters a little in advance of the others, in the direction of their cutting movement, so that some of the nails shall be cut a little before the others for the purpose of relieving the strain upon the machine, substantially as described.

Second, The series of recesses in the cutter stock formed substantially as shown, to determine the position of the cutters in the stock, or the employment of equivalent means to accomplish the same purpose, substantially as described.

Third, I claim the method herein described of confining the cutters in the stock.

Fourth, I claim the employment, in combination with the shifting frame and carriage, of pincers and clamps, for the purpose of holding the sheet and presenting it to the cutters, substantially as described.

Fifth, I claim the employment, in combination with the sliding frame, K, of the stops, L2 L2, or other equivalent device, for arresting the movement of the frame at the same fixed point in either direction, substantially as described.

Sixth, I claim the employment, in combination with the frame, K, and carriage, L, or their equivalents, of the fixed and yielding guides, S and S', or their equivalents, to guide the sheet of metal laterally, as it is moved forward, substantially as described.

52,480.—Lamp.—Charles Wilhelm, Philadelphia, Pa.:

I claim the spring, E, when fastened to the body of the lamp, and arranged in combination with the notched ring, B, substantially in the manner and for the purpose described.

52,481.—Sounding Telegraph.—Elisha Wilson, New Haven, Conn.:

First, I claim controlling either continuous or intermittent air, gas or vapor sounding for telegraphic purposes, without stopping the flow of air, gas or vapor, by which the sound is produced.

Second, I claim a pallet or tongue, v or v', or any substantially equivalent device adapted to intercept, regulate, or control the vibrations of air, gas or vapor, against the edge of the lip, u, in order to vary or suppress the sound, substantially as explained.

Third, I claim the employment of continuous sound from air gas or vapor sounding instruments, for telegraphic signals, by transition from one tone or pitch, key or pulsation to another, either at the main or at any secondary sounding orifice, substantially as above set forth.

52,482.—Furrowing Machine.—John J. Wilson, Abingdon, Ill.:

I claim a furrowing or marking device composed of a plurality of wheels placed on an angle and arranged with a draft pole and driver's seat, substantially as herein shown and described.

[This invention relates to a device for furrowing or marking land for the planting of corn and other seed in check rows. It consists in having an axle provided with three wheels placed at equal distances apart, the axle having a draft pole connected to it and a proper framing formed to support a driver's seat; three furrows may be made simultaneously, and the work of furrowing or marking land for the purpose specified greatly expedited.]

52,483.—Bending Wood.—William C. Wright, Trenton, N. J.:

I claim the arrangement of the flexible plate, b, clamps, c c, bolts, d d, and rivets, f f, with the forming frame, a, as and for the purpose explained.

52,484.—Safe.—Linus Yale, Jr., Shelburne Falls, Mass. Antedated Dec. 9, 1865:

I claim the angular plates or sections of hard metal, consisting of corner pieces and edge or filling pieces (when constructed, arranged and applied to the exterior of the inner wrought iron portion of the walls of a safe, substantially in the manner and for the purposes hereinbefore described.

52,485.—Pump.—Levi Beemer, Libertyville, N. J., assignor to himself and J. H. Williamson, Branchville, N. J.:

I claim the combination of the two pump cylinders, B B,' with the pistons, F E, and valves and the yoke, G, arranged to operate substantially in the manner as and for the purposes set forth.

[This invention relates to a new and improved pump in which the suction or lift and the force pump are combined, and by which almost all of the water in a well or reservoir may be drawn. The invention is designed for what is commonly termed a submerged pump, the cylinders being placed near the bottom of the well or reservoir.]

52,486.—Coal-ashes Lifter.—John W. Cambell, New York City, assignor to himself and Walter Joralemon, Newark, N. J.:

I claim constructing and combining the sieve and ash box, substantially in the manner and for the purpose herein above set forth, as an article of manufacture.

52,487.—Wrench.—John C. Connor, Williamsburgh, N. Y., assignor to T. J. Hennessy, New York City:

I claim the stationary jaw, A, with its fixed longitudinal slotted tube, C, in combination with the screw shaft, F, screwing into the movable jaw, L, and encased within and by the said tube with its handle, I, said jaw, L, moving in and being guided by the said slotted tube, substantially as herein described and for the purpose specified.

[This invention relates to that class of wrenches in which a stationary and a movable jaw are used, and it consists in a novel construction and arrangement of such jaws, with regard to each other, whereby the efficiency and convenience of the wrench is increased.]

52,488.—Folding Chair.—Isaac M. Dann, New Haven, Conn., assignor to the New Haven Folding Chair Company:

I claim the use in a folding chair of the character herein de

© 1866 SCIENTIFIC AMERICAN, INC.

scribed of a curved or bowed back round for the seat whether the same be placed between or in rear of the front legs of the chair, as and for the purposes herein set forth.

52,489.—Machine for Felting Hat Bodies.—Cyprien Faure (assignor to himself and C. Francis Bates), New York City:

I claim the box, A, with the longitudinally slotted table, A', in combination with the longitudinally slotted plank, B, and with a suitable roller or rollers, the whole constructed and operating substantially as and for the purpose described.

[The object of this invention is to produce a machine which performs the operation of felting hats in imitation of the ordinary hand process.]

52,490.—Method of Treating Gold Ores.—Halvor Halvorson, North Cambridge, Mass., assignors to himself and Wm. T. Eustis, assignors to themselves and Levi L. Cushing, Jr.

I claim the treatment of gold and silver bearing pyritous ores in the manner and for the purposes herein described.

52,491.—Curriers' Scourer.—John Hankey (assignors to himself and Henry Muller,) North Cambridge, Mass.;

I claim the improved curriers' scourer as made with the metallic socket piece combined and arranged with the handle and the stone, and with the handle provided with the adjusting screws, and the recesses for reception of their heads, substantially as described.

52,492.—Sash Locks.—James Hollingsworth (assignors to C. M. Henderson), Chicago, Ill.:

I claim, First, The application of the jaws, B B', to a plate, A, having a projecting rim, a, for the purpose of forming a space between the surface of said plate and the jaws to receive the pins, h h, and spring, g, substantially as described.

Second, The stud, b, in combination with the cup shaped plate, A, and jaws, B B, substantially as described.

52,493.—Machine for Reducing or Pointing Wires.—Orrin L. Hopson, and Eli J. Manville, Waterbury, and Heeman P. Brooks, Walcottville, Conn., assignors to Orrin L. Hopson, Waterbury, and Heenan P. Brooks, Walcottville, Conn.:

I claim, First, a series of toggle blocks, k, mounted substantially as specified, in combination with the die, l, shaft, b, and jaw, e, substantially as and for the purpose set forth.

Second, We claim the combination of the blocks m, and screws, l, with the toggle blocks, k, and die l, as and for the purposes specified.

Third, We claim the spring n, fitted as specified in combination with the toggle blocks, K, and die, l, as specified.

Fourth, We claim the jaw, d, on the center, e, carrying half the divided die, l, at one end in combination with the adjusting screw, g, applied to the opposite end of the jaw, d, as and for the purposes specified.

Fifth, We claim the cylinder or pin, o, in combination with the jaw, d, and toggle or cam blocks, K, for the purposes and as specified.

52,494.—Bolt Heading Machine.—Lancelot Kirkup, Brooklyn, N. Y., assignor by mesne assignment to The Bolt Rivet and Spike Co., New York City:

We claim—First, The arrangement of two die carrying disks, one on either end of the frame, B, in combination with suitable punchers, H, with a yoke, I, and eccentric, n, or their equivalents, constructed and operating substantially as and for the purpose specified.

Second, The troughs, L, in combination with the die carrying disks, A, arranged substantially as and for the purpose specified.

52,495.—Hay and Cotton Press.—Marquis D. Moore, (assignor to himself and Samuel Bromburg, Brooklyn, N. Y.:

I claim the toggle levers, constructed as herein described and conical windlasses in combination with the two inclined extensions or end pieces c c, as and for the purposes herein specified.

52,496.—Rotary Plow.—David Myers (assignors to himself and Wm. H. Kretsinger), Chicago, Ill.:

I claim the employment of a series of rings in combination with the revolving cylinder, F, and shovels, a, arranged and operating substantially as and for the purposes herein shown and described.

52,497.—Door Guard.—Noah C. Perry and George S. Gladding, Chester, Conn., assignors to Jeremy W. Bliss, Hartford Conn.

We claim as a new and useful article of manufacture a door guard, substantially in the manner as and for the purpose described.

52,498.—Heel-polishing Machine.—James M. Thompson, Stoneham, Mass., and L. D. Tripp, Lynn, Mass., assignor to S. D. Tripp:

First, We claim the loose disk, D, placed at one end of the rotating polishing shaft, C, in connection, with the gage, E, substantially as and for the purpose specified.

Second, In connection with the polishing shaft, C, the frame or bar, G, suspended by a spring, H, from an upright, A, or other fixture, and provided with a rotating disk, J, in which a sliding plate, K, is fitted, having the boot or shoe attached substantially as and for the purpose set forth.

Third, The supplemental shaft, F, in combination with the polishing shaft, C, and the frame or bar, G, provided with the disk, J, containing the sliding plate, K, substantially as and for the purpose specified.

[The object of this invention is to obtain a new and useful device for polishing the edges of the soles of boots and shoes, one which may be manipulated with the greatest facility, and perform its work in an expeditious and perfect manner, and be capable of being adjusted to operate upon soles of greater or less thickness.]

52,499.—Heel-polishing Machine.—James M. Thompson, Stoneham, Mass., and S. D. Tripp, Lynn, Mass., assignors to S. D. Tripp:

We claim the revolving block, D, placed loosely on the driving shaft, C, and provided with polishing stones or wheels, E E', driven from such shaft, all arranged substantially as and for the purpose herein set forth.

[This invention relates to a new and improved mode of arranging the polishing stones or wheels of a heel-polishing machine, whereby either of the stones or wheels—two being used—may, by a very simple manipulation, be placed or adjusted in the necessary position to have the heel of the boot or shoe applied to it.]

52,500.—Planter and Seeder.—Horace H. Webster (assignor to himself and Sylvester Davis), Claremont, N. H.:

First, I claim the combination of a corn planter and seed drill, substantially as herein described.

Second, My device for raising the plows and coverers from the ground and lowering them thereto, substantially as set forth.

Third, The valves, Y, notched wheels, V, and cog wheels, E, constructed, combined and arranged substantially as described.

52,501.—Car Brake.—W. E. Wilcox (assignor to himself and Luther Moses), Cleveland, Ohio:

First, I claim the arrangement of a steam cylinder with the horse couplings and friction wheels, when arranged and combined in the manner herein specified and for the purposes set forth.

Second, I also claim the construction of the horse couplings, when arranged and combined with car brakes operated by straw, as herein described and for the purposes set forth.

Third, I also claim the friction wheels to be placed between or on either side of the car wheels, as herein described and for the purposes set forth.

52,502.—Machine for Welding the Ends of Railroad Rails.—Hugh Baines, Manchester, Eng., residing temporarily in Canada:

I claim the means herein set forth for applying steel braces to the ends of rails and railway points, that is to say, the devices designated by the figures 1, 2, 3, and the plunger or die, S, the said devices being operated substantially as shown.

52,503.—Mode of Securing Photographic Pictures on Ceramic Ware, Etc.—J. B. Obernetter, Munich, Kingdom of Bavaria:

I claim the herein-described process of producing photographic pictures on ceramic articles, including glass, to be burnt in as set forth.

52,504.—Combined Sword and Pistol.—August Rauh, Solingen, Westphalia, Prussia:

I claim the combination with the sword blade and its handle of a many-chambered rotating cylinder and fixed barrel, when the base pin for the cylinder is formed of the blade stock and the several parts are arranged and operated as hereinbefore described.

Second, I also claim the constructing and arranging the breech plate, n, so as to constitute also a hammer supporter during the loading operations, substantially as described.

52,505.—Self-winding Watch.—F. Robert Theurer (assignor to Charles Aubens & Co.), Chaux de Fonds, Switzerland:

I claim actuating the winding mechanism of the watch by the movement of the cover, substantially as herein set forth.

52,506.—Flax-spinning Machine.—Levi Skeels, Worthington, Ohio:

I claim First, The arrangement of vibratory slit holdee, F f, notched feeder, G g, spring finger, H, and stud, for detaching and feeding forward the flax, substantially as set forth.

Second, In combination with the above-claimed feeding mechanism, I claim the clamp, J J', constructed and operating as set forth.

Third, The described arrangemant of clamp, J J', and yielding rest, L, for the purpose explained.

Fourth, The flyer, K K K', formed and arranged to wind evenly upon the bobbin as set forth.

52,507.—Shingle Mill.—Thos. H. Cox, Nashville, Tenn.:

First, I claim the combination of the saw, B, rising and falling bed, M, pitman, L, and crank wheel, f, as and for the purposes specified.

Second, The combination and relative arrangement of the shafts, R R, pinions, Q Q, slides, N N, racks, i i, ratchet toothed wheels, T T, and fixed pawls, V V, for setting the bolt, as explained.

Third, In combination with the before-named shafts, R R, pinions, Q Q, and racks, i i, I further claim the eccentric, S, and slotted plates, K l, arranged to operate as and for the purposes set forth.

Fourth, I also claim the combination of the lever, O, spring, P, toothed segment, a, sliding toothed dog, h, and fixed dog, h, arranged to operate as and for the purposes specified.

52,508.—Tweer.—Even Kooms, Funkstown, Md.:

First, I claim the cup or dish-formed fire iron or tweer, constructed in the manner described, for the purpose of allowing the the cinders to flow away from the air-discharge openings and for the purpose of preventing the same from flowing out against the brick work, substantially as described.

Second, I also claim the use of the conical weighted plug, constructed as and for the purposes herein described.

REISSUES.

2,166.—Self-mousing Hook.—The Middletown Tool Company, Middletown, Conn., assignees by mesne assignments of J. R. Henshaw. Patented Oct. 26. 1858:

We claim locating the spring of a snap hook, substantially as shown and described, so as to act upon points intermediate between the hinge and hook proper, in combination with forming recesses for holding the spring, as set forth.

2,167.—Tool.—The Washoe Tool Company, New York City, assignees of H. L. Lowman. Patented June 6, 1865:

We claim an elliptical socket the opposite sides of which are parallel to each other, and elongated in the line of its axis, in combination with one or more projecting arms or bits merging by curved lines into the socketed head, substantially as described and represented.

DESIGNS.

2,259 to 2,262.—Fabric Trimming.—Thomas Merry (assignor to Samuel Needham), Philadelphia, Pa. Four patents.

Notes and Queries

N. H. B., of Me.—Iron is converted into steel by absorbing from 1 to 1¾ per cent of carbon. The iron is placed in an air-tight vessel along with a little pulverized charcoal, and kept at a white heat for a long time—from 2½ hours to 3 days.

R. O., of Mass.—The United States $10 gold piece weighs 258 grains, 900 parts in 1,000 being gold. A grain is the same in Troy and advordupois weight—480 grains make an ounce Troy, and 437½ an ounce avoirdupois.

C. E. P. can receive an answer to his inquiry calling for a coating for the inside of wooden pipes—impervious, without smell or taste—by addressing John S. Lipps, No. 28 Joralemon street, Brooklyn,

J. H. W., of Pa.—The experiments at Fairmount Waterworks took place in 1860. No doubt Mr. Birkenbine, Chief Engineer of water works, will give you all the information. The challenge referred to is all we know of the matter. We have no information respecting Gardissal's Technical Dictionary.

McJ. G., of Ohio.—Why will not red lead answer to protect your iron hoops from rust? It is the cheapest and simplest substance we know of.

W. M. C., of R. I.—The subject of cone pulleys has been fully treated of in the Scientific American. In Vol. II., new series, page 38, and in Vol. XI., page 69, you will find the information sought.

J. G. C.—The milling is done by a tool sold in all tool stores. It consists of a small steel wheel cut with the teeth and set in a jaw. When held against the work the wheel revolves and leaves the indentations which constitute the milling.

C. C. M., of Ill.—Any good force pump will raise water 345 feet. The larger you have your pipe the less friction will there be from the water passing through it; and in so long a pipe the friction consumes a large proportion of the power.

B. & Co., of Tenn.—We should not give an opinion in regard to the best lime kiln without a practical trial; and this we are not prepared to make.

J. F. D., of Pa.—The pressure on the top and bottom of a boiler is not the same, it being greatest at the bottom, by reason of the weight of the water.

S. R.—Shafting running at right angles by belts is not new. Many examples can be seen in this city.

H. M. C.—Patents are granted in England to the first applicant, who need not be the inventor.

O. S., of Ohio.—In filling a barometer tube with mercury there is considerable difficulty in obtaining a perfect vacuum A small portion of pure mercury is boiled in the tube, and when this is cooled another portion is added and boiled; and so on until the tube is full. When the tube is filled it is inverted in a vessel of pure mercury.

D. C. L., of La.—Beeswax is bleached by exposing it in thin sheets to the sun, wind, and rain, frequently changing the surface thus exposed by remelting the wax and again reducing it to thin flakes.

S. D. E. says:—"A strange phenomenon took place here last week. An artist took a picture of a child (an ambrotype), and when he developed it there appeared in the background the head of a youth about sixteen years old. He cannot account for it, as he says the plate was a new one, never used before. I think he must be mistaken. I think he redeveloped the outlines of an old picture. Will you please let me know how it could or did occur. I want to clear up some superstitious notions in this place. Anything but superstition for me." ANS.—Your theory is correct. The plate was an old one, not absolutely clean when used. The redevelopment of an old picture in this way some times occurs in photography.

J. C. W. asks:—"How much ought a man to get for the exclusive right of a patent on perpetual motion, if he should be fortunate enough to invent it?" As much as he can.

J. F. B., of Ohio.—Iron is a better conductor of electricity than water.

R. F. W., of N. Y.—The specimen which you sent is quartz.

H. B. H.—The Patent Office Report for 1851 was not illustrated.

PATENT OFFICE.

PATENTS GRANTED FOR SEVENTEEN YEARS.

MUNN & COMPANY.

In connection with the publication of the SCIENTIFIC AMERICAN have acted as Solicitors and Attorneys for procuring "LettersPatent" for *new inventions* in the United States and in all foreign countries during the past *twenty years*. Statistics show that nearly ONE-HALF of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after so many years' experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office.

Judge Mason, formerly Commissioner of Patents, says, in a letter addressed to us:—"In all your intercourse with the office, I always observed a marked degree of promptness, *skill*, and fidelity to the interests of your clients."

Ex-Commissioner Holt says:—"Your business was *very large*, and you sustained and justly deserved the reputation of *marked ability* and *uncompromising fidelity* to the interests of your clients."

Ex-Commissioner Bishop says:—"I have ever found you faithful and devoted to the interests of your clients, as well as *eminently qualified* to perform the duties of Patent Attorneys."

EXAMINATIONS.—If an inventor wishes our opinion in regard to the probable novelty of his invention, he has only to send us a pencil or pen-and-ink sketch of it, together with a description of its operation. For an opinion, without examination at the Patent Office, we make no charge, but if a

PRELIMINARY EXAMINATION AT THE PATENT OFFICE

is desired, we charge the small fee of $5. This examination involves a personal search at the Patent Office of all models belonging to the class, and will generally determine the question of novelty in advance of an application for a patent. Up to this time we have conducted over ELEVEN THOUSAND Preliminary Examinations, thus showing a more intimate knowledge of inventions at the Patent Office than can be possessed by any other person or firm.

If an inventor decides to apply for a patent, he should proceed at once to send us by express, charges prepaid, a model not over one foot in size, and substantially made. He should also attach his name and residence to the model.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue stamp taxes Canadians have to pay $500.

FOREIGN PATENTS.—Messrs. MUNN & CO. have had more experience than any other solicitors in this country in procuring foreign patents, and have old established agents in London, Paris, Brussels, Berlin, Vienna, and other large cities. Foreign business should never be intrusted to other than experienced agents.

Messrs. MUNN & CO. give special attention to the preparation of Caveats, and to the prosecution of the EXTENSION OF PATENTS, Reissue of DEFECTIVE PATENTS, REJECTED CLAIMS, INTERFERENCES, and DISCLAIMERS. They also prepare ASSIGNMENTS, LICENSES, AGREEMENTS, and CONTRACTS, in reference to Patents, and will advise patentees when their rights are infringed in reference to bringing suits against INFRINGERS. In connection with a Patent Lawyer of eminent ability, they prepare and conduct cases in the United States Courts. Indeed, there is no branch of Patent business which MUNN & CO. are not prepared to undertake.

If an inventor wishes to apply for a patent, all he has to do is to write to us freely for advice and instruction, and he will receive prompt attention. If his invention contains any patentable features, he can depend upon getting his Letters Patent. All communications considered confidential. Send models and fees addressed to

MUNN & CO.,
No. 37 Park Row.

© 1866 SCIENTIFIC AMERICAN, INC.

NEW RATES OF ADVERTISING.

FORTY CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

CHARLES A. SEELY (LATE PROF. OF CHEMISTRY in the N. Y. Medical College), Consulting and Analytical Chemist. 246 Canal st., N. Y. Advice, instruction, investigations, etc. Analyses of metals, minerals, commercial products, etc. 1*

NEW EDITIONS!—THE PICTORIAL DOUBLE NO.'S for Jan. and Feb., PHRENOLOGICAL JOURNAL, with PHYSIOGNOMY, ETHNOLOGY, PHYSIOLOGY, and PSYCHOLOGY, now ready, 20 cents each, or $2 a year. Address
8 2 FOWLER & WELLS, 389 Broadway, New York.

VALUABLE AMERICAN AND ENGLISH PATENTS manufactured and sold for cash, on commission. Consignments respectfully solicited. Address
KENYON & CO., No. 151 Broadway, N Y.
"Kenyon & Co., are a reliable firm." H. M. Wells, Director Broadway Bank, N. Y.; Jacob Miller, Director Citizens' Bank, N. Y.

H. N. WINANS, NO. 11 WALL STREET, NEW York, has 6,000 proofs of the efficiency and economy in using his INCRUSTATION POWDER. Guaranteed anywhere. 8 2*

LIFE-SIZED PHOTOGRAPHIC PORTRAITS, ELEGANTLY Framed, for $25, by the new process of
1* ROCKWOOD & CO., No. 839 Broadway.

STEAM ENGINES FOR SALE.—ONE VERTICAL Inverted, 8-inch cylinder, 12-inch stroke. One that may be used vertical, horizontal, or inclined. One Dimphel Blower, 48x22 inches.
F. W. BACON & CO, No. 84 John street, N. Y.

INDICATOR APPLIED TO STEAM ENGINES TO ascertain their condition and power, also to determine the amount of power used by tenants. F. W. BACON.
8 12 Consulting Engineer, No. 84 John street, N. Y.

ANDERSON & SCHERMERHORN, PATTERN AND Model Makers, Gearing Cocks, Valves and Engine. Patterns of every description. Rear No. 47 Ann street, second floor. 1*

SHEET IRON WORKERS.—WANTED, TO MAKE arrangements with manufacturers of stoves and furnaces for introducing an improvement for increasing the draft of chimneys and ventilators. Photograph sent on application. Address ALFRED JEFFERY, care Northern Central Railway, Baltimore, Md.

COAL $2 PER TUN.—THE WHOLE UNION, OR State, County, or City Rights for sale. A Patent Process of Aggregating Coal Dust of Waste Coal into lumps of any size, together with machinery which will produce 100 tuns daily, costing $2 per tun, and worth more than new coal. Address H. D. S., Box 773, Post-office, New York. 8 2*

WOOD AND METALLIC PIPES COATED WITH AN impervious and healthful patent compound, for the purpose of conveying water or liquids for drinking and other purposes. Address THOS. HODGSON, No. 7 Beach place, Brooklyn, N. Y. 1*

CIRCULAR SAWS,
WITH EMERSON'S PATENT MOVABLE TEETH,
Require less power, less skill, less files—saw smoother and better, cut less kerf—the saw always retains its original size. Send for descriptive pamphlet, containing information of value to all parties interested in lumber and sawing of any description.
Address AMERICAN SAW COMPANY, No. 81 Beekman street, N. Y., or Factory, Trenton, N. J. 8 4*

STEAM AND WATER GAGES, SCOTCH GLASS Tubes, Counters, Indicators, and Pyrometers, for sale.
1* E. BROWN, 311 Walnut street, Philadelphia, Pa.

FOR SALE—THE RIGHT FOR NEW ENGLAND and New York or a recent and valuable Patent.
8 2* S. C. EATON & CO., 1,114 Market st., Philadelphia, Pa.

NYSTROM'S NEW BOOK—JUST PUBLISHED.

ON TECHNOLOGICAL EDUCATION AND SHIPBUILDING FOR NAVAL AND MARINE ENGINEERS. By JOHN W. NYSTROM, late Acting Chief Engineer, U. S. Navy. In one volume, 12mo. Price $1 50; by mail free of postage.

Among the subjects discussed by the able and distinguished author are the following:—Technological Education, Steam Engineering, Failure of Steamers, Expansion Experiments, Condensers, Natural Effect of Steam, Scientific Books, Steam Engineering and Shipbuilding, United States Naval Academy, Want of Applied Science in our Workshops, Locomotive Engineering, Chief Engineer Isherwood, Parabolic Construction of Ships, Dynamics, Capt. Fox on Engineering and Construction of Ships, Steam-boiler Explosions, Etc., Etc.

The above or any other of my PRACTICAL AND SCIENTIFIC BOOKS sent by mail, free of postage, at the publication prices. My new catalogue sent free of postage to any one who will favor me with his address. HENRY CAREY BAIRD.
Industrial Publisher, 406 Walnut st., Philadelphia.

SAW GUMMERS, UPSETS, SWEDGES AND OTHER Saw Tools. Send for a Circular.
8 13 G. A. PRESCOTT, Sandy Hill, N. Y.

LATEST IMPORTATIONS.
PERCY'S IRON AND STEEL.
TATE'S PETROLEUM.
KURR'S MINERAL KINGDOM.
JACOBS'S PRECIOUS METALS.
RUSSELL'S ATLANTIC CABLE.
D. VAN NOSTRAND, 192 Broadway,
Publisher and Importer.
*** Send for Circulars.

IMPORTANT TO MILL OWNERS.—DOUBLE PARALLEL EDGERS constantly on hand, edges from 2½ inches to 38 inches wide. For descriptive circulars and terms for rights address
HAYES & NEWMAN,
8 6*eow Unadilla, Otsego Co., N. Y.

---

25 HORSE-POWER ENGINE AND BOILER IN GOOD Running Order for sale. Inquire of E. L. PEROT & CO., 69 Pearl street, up stairs. 8 3*

COPPER PLATING OF CAST IRON.—A NEW, SIMPLE mode of copper-plating cast iron without galvanic battery, for sale by A. SCHELLER, 36 Beekman street, New York.
8 2

YELLOW PINE LUMBER.—THE OGLETHORPE MILLS, Savannah, Ga., will manufacture Georgia Yellow Pine Lumber, for Mining Companies, Factories, Ship Builders, Etc., Etc. Address the agents, Messrs. WINBORN LAWTON & CO., Savannah, Ga., or Messrs. JOHN H. LIDGERWOOD & CO., 175 Pearl street, New York. 8 12

WATER WHEELS.—THE HELICAL JONVAL TURBINE, for first-class mills where great economy of water is desired, made by J. E. STEVENSON, Hydraulic Engineer, 40 Dey street, New York. 8 6*

THE COMPLETE PRACTICAL DISTILLER.

Just published, a new edition of The Complete Practical Distiller, comprising the most perfect and exact theoretical and practical description of the Art of Distillation and Rectification; including all of the most recent improvements in distilling apparatus; instructions for preparing spirits from the numerous vegetables, fruits, etc.; directions for the distillation and preparation of all kinds of brandies and other spirits, spirituous and other compounds, etc., etc; all of which is so simplified that it is adapted not only to the use of extensive distillers, but for every farmer, or others who may wish to engage in the art of distilling. By M. LA FAYETTE BYRN, M. D. With numerous engravings.

In one volume, 12mo. Price $1 50; by mail free of postage.

CONTENTS.

Description of a Distillery; Some Directions to the Distiller; Of Distillation, and the Apparatuses made use of; Continuous Distillation; Mode of Working the Apparatus; Apparatus used principally in American and English Distilleries; Instrument to Prevent Inequality of Heat in Distillation; Of the Process of Malting etc.; French Method; English Method; Fermentation; Rectification; Common Process of Malt Distilling; French Process of Distilling and Preparing Brandy; Method of Preventing the Deterioration of Brandies; Malt Whisky; Process for Making Dutch Geneva; Process for Brewing Hollands Gin; Process for Rectification into Hollands Gin; Distillation of Common Gin; Spirit of Potatoes; Apparatus made use of in the Distillation of Potato Spirit; Reduction of Potatoes; Mashing of Potatoes; Rasping Potatoes; Separation of the Fecula; Draining; Arrack, or Spirits of Rice; Spirits of Beet Roots; The Beet Rasp; Kirsch Wasser, or Spirits of Cherries; Of some of the Products of this Country which afford Spirits by Distillation; Cider Spirits, or Apple Brandy; Peach Brandy; Of the Preparation and Distillation of Rum; Process made use of in Great Britain and Ireland for Fermenting and Distilling Molasses; Raisin Spirits; Flavoring and Coloring of Spirits; Process for Making Rum Shrub; Process for Making Brandy Shrub; Elder Juice; Method of Making Cherry Brandy; Eau de Luce; Irish Usquebaugh; Process of Making Nectar; Imperial Ratafia; Method of Making Lovage Cordial; Process of Making Citron Cordial; Cinnamon Cordial; French Noyau; Peppermint Cordial; Process of Making Aniseed Cordial; Method of Making Caraway Cordial; French Vinegar; Method of Making English Vinegar; Some General Directions for the Distillation of Simple Waters, etc.; Of the Stills used for Simple Waters; Cinnamon Water; Peppermint Water; Damask-rose Water; Orange-flower Water; Orange Wine; Simple Lavender Water; Compound Lavender Water; Hungary Water; Some General Directions for the Distillation of Spirituous Waters; Jessamine Water; Eau de Beaute; Some Remarks on the Uses of Feints, and their General Character; Rules for Determining the Relative Value and Strength of Spirits; Observations on Distillations of a Special Character, and on the Selection of Apparatus most useful: Remarks on an Instrument intended for Testing Wines; Some General Directions for the Preparation of various Cordials, Compounds, etc.; On some of the Plans resorted to for the purpose of Adulterating Brandy; Process for Making Lime Water; Process of Making Sulphuric Ether; Instructions for Making Infusions, Spirituous Tinctures, etc.; Tonic and Alterative Cordial; Aromatic Bitters; Process for Making a Diuretic and Stomachic Compound; Process for Making Tincture of Musk.

☞ The above or any other of my PRACTICAL and SCIENTIFIC BOOKS sent by mail, free of postage, at publication prices. My new catalogue sent free of postage to any one who will furnish me with his address. HENRY CAREY BAIRD,
Industrial Publisher, 406 Walnut street, Philadelphia.

PROPOSALS FOR THE EXCLUSIVE AMERICAN Manufacture of Livermore's Improved Fishhook, as per engraving, No. 7, SCIENTIFIC AMERICAN, will be received by him at Ashland, Schuylkill Co., Pa 1*

ELDRIDGE'S ANTI-FRICTION WHEELS FOR BELT GEARING—One of the most remarkable inventions of the age, securing a great saving of power in mills, factories, foundries, machine shops, and machinery generally. Rights for sale Send for circular with cuts. Address ELDRIDGE & THATCHER,
8 2* No. 1,106 Market street, Philadelphia, Pa.

WILSON'S STEAM TRAPS.—GREAT SUCCESS.—This is a simple, cheap, and very effective device for freeing all kinds Steam Apparatus from air and water of condensation. For illustrated Circular containing full information send to GREENWOOD PIPE CO., Canal and Walnut Streets, Cincinnati, Ohio.
8 5*

TO INVENTORS, PATENTEES, AND DEALERS IN Light Wares.—Orders for manufacturing in any quantity promptly filled, and models made, by W. X. STEVENS,
8 2* No. 11 Cypress street, Worcester, Mass.

IMPROVED CIRCULAR SAW ARBOR.—THIS IMPROVEMENT is for centering saws on their arbors when the hole in the saw is larger than the arbor. The saw is centered instantly and with precision. It can be attached to any ordinary arbor now in use. State Rights for sale. For further particulars address W. T. & L. H. RAND, Patentees, Manchester, N. H 8 2*

LUMBER CAN BE SEASONED IN TWO TO FOUR days, by Bulkley's Patent, at an average cost of $1 per M. from the green. For circular or information address
7 5* C. H. BULKLEY, No. 124 Superior st., Cleveland, Ohio.

CLOCKS FOR TOWERS, OFFICES, ETC., ALSO Glass Dials for illuminating. Address
7 13eow] JOHN SHERRY, Oakland Works, Sag Harbor, N. Y.

SPRINGS—POLISHED AND UNPOLISHED—MANUFACTURED by ELI TERRY, Terryville, Conn. 7 8*

SUPERIOR PATENT DRAW LIME KILN—WILL burn Finishing Lime with any coal or wood—50 per cent saving over all other kilns. Apply to C. D. PAGE,
7 9* Rochester, N. Y.

HARRISON'S BURR MILLS—WARRANTED TO grind, of Corn, 48-inch stone, 40 bushels per hour; 36-inch stone, 30 bushels; 30-inch stone, 20 bushels; 20-inch stone, 10 bushels; 12-inch stone, 5 bushels. EDWARD HARRISON,
7 8 New Haven, Conn.

REYNOLDS' TURBINE WATER WHEELS.—GREAT Improvements and Reduction in Prices. The best, cheapest, most reliable, and awarded the Gold medal for superiority. Circulars sent free. GEO. TALLCOT, 170 Broadway, N. Y.,
7 13 Late Tallcot & Underhill.

FIRST-CLASS MACHINISTS' TOOLS.—36-INCH Lathes, 32-inch Planers, 48-inch Radial Drill and Bolt Cutter, on hand for instant delivery; 25-inch Lathes, 10-inch Shapers, and 24-inch Planers making. E. & A. BETTS,
7 5 Wilmington, Del.

A BLAST CYLINDER, 18 BY 30 INCHES, FOR sale low. Address A. FAIRCHILD,
7 2* Morgantown, West Va.

WOODWORTH PLANERS AND WOOD TOOLS.—Having purchased the good will of our late firm of J. A. Fay & Co., Worcester, Mass., I will thank our friends in want of first-class, eastern-made machinery to continue their orders.
Address as formerly, or E. C. TAINTER,
7 2* Successor to J. A. Fay & Co., Worcester, Mass.

---

200 COUNTIES SOLD IN SIX MONTHS.—COUNTY and State Rights for sale to manufacture the best Wood-sawing Machine in use; saws from 75 to 100 cords of wood per day from logs; is simple, durable, efficient, and cheap. For machines or information apply to JOSEPH SALMON,
7 2* Rozetta P. O., Henderson Co., Ill.

STEAM ENGINES—WITH LINK MOTION, VARIABLE automatic cut-off, of the most approved construction; Mill Gearing, Shafting, Hanger, Etc. Address M. & T. SAULT,
7 26 New Haven, Conn.

SCHOOL OF THE MASSACHUSETTS INSTITUTE OF Technology, Boston.—A professional school for the Mechanical, Civil, or Mining Engineer, Practical Chemist, Builder, and Architect; also provides a general education founded upon the Sciences, Modern Languages, and Mental and Political Philosophy. Requisites for admission:—Arithmetic, Algebra, Geometry, English Grammar, Geography, and the rudiments of French. Examinations for admission, June 4 and Sept 20. Special students admitted to partial courses without examination. For catalogue apply to
6 13eow WM. P. ATKINSON, Secretary.

$3.000 WILL BUY A FINE HOUSE AND Lot and Water-power Shop in a pleasant village. House new, large, and convenient; three acres of land; choice fruit in abundance, good barn, two-story shop, six-horse wheel, two lathes, all in running order. Address
J. B. WEST,
7 2* Lakeville, Livingston Co., N. Y.

PATTERN LETTERS AND FIGURES (METALLIC)—For Foundrymen, Machinists, Pattern Makers, and Inventors, all sizes, at wholesale and retail, by
7 9* KNIGHT BROS., Seneca Falls, N. Y.

WOOD-WORKING MACHINERY.—WE ARE BUILDING Woodworth Planing, Tonguing, and Grooving Machines, from new patterns of the most approved styles and best workmanship; also furnish all kinds of Wood-working Machinery at manufacturers' prices. WITHERBY, RUGG & RICHARDSON,
7 9* Corner Union and Central sts., Worcester, Mass.

THE SAFETY BRIDLE AND LINES PREVENT ALL accidents by horses. Cost no more than the old style, and pay larger profit than any other business to sell rights. See engraving, No. 5, present volume. State and County Rights for sale. Send for a circular to S. B. HARTMAN,
6 12* Box 47, Millersville, Lancaster Co., Pa.

MOSES G. WILDER & CO., WEST MERIDEN, Conn., have experience in, and give careful attention to Designing, Arranging, and Manufacturing all kinds of nice Machinery and Automatic Tools, Die Sinking, light Jobbing, Etc., to order.

Manufacture Wilder's Patent Power Punching Press, Wilder's Patent Universal Milling Machine, and Newell's "Centering and Squaring" Lathe Attachment.

Parties wishing to contract for any machinery or tools requiring good workmanship are invited to correspond.
Meriden, Conn., Jan. 27, 1866. 6 4*

WANTED—AGENTS—$150 to $200 PER MONTH, TO sell the celebrated COMMON SENSE FAMILY SEWING MACHINE. Price $18 The cheapest Family Sewing Machine in the United States. Every machine warranted for three years. Send for descriptive circulars. Address SECOMB & Co., Chicago, Ill., or Cleveland, Ohio. 6 12*

CONNECTICUT IRON WORKS,
Manufacturers of
Portable and Stationary Steam Engines, Boilers, Steam Pumps, Etc.
Also,
Evans & Burges' Patent Water Front Forge.
6 12* No. 157 Temple street, New Haven, Conn.

MANUFACTURERS' AGENCY—FOR THE SALE OF Agricultural Implements and Machinery in General. Will accept agencies for the sale of articles required in a Southern market.
REUBEN NICKERSON, Athens, Ga.,
who desires description and prices of the best rotary pump (power). 6 3*

INVENTORS' HEADQUARTERS, INVENTORS' AGENCY, and N. Y. Mfg. Co., 37 Park Row, N. Y., having been established for several years, have superior facilities for manufacturing new articles and selling patents on com. Send stamp for circular. 6tf

---

STEAM GAGES—BATES'S PATENT—GOVERNMENT and City Standards.—The cheapest and best steam gages ever offered in this market. Also Water Gages, Marine Clocks, Registers, Etc. Call and Examine, or send for circular before purchasing elsewhere. KEEN BROTHERS, No. 218 Fulton st.

REFERENCES.—Messrs. Hopper and Douglas, U. S. Inspectors; Capt. Lord, M. P. Inspector; Messrs. Todd & Rafferty, No. 64 Dey street; New York S. E. Works, Twenty-third street, E. R.; Wash. I. Works, Newburgh. 6 4*

STEAM-BOILER EXPLOSIONS.—NO BOILER should be without one of Ashcroft's Low Water Detectors. Call on or address [4 12*] JOHN ASHCROFT, 50 John st., N. Y.

BOILER FELTING.—STEAM BOILERS, STEAM Pipes, Etc., felted with hair and wool felt, will save 25 per cent of your coal pile. JOHN ASHCROFT, No. 50 John street, is prepared to furnish and put on felting at once. 4 12*

N. C. STILES'S PATENT POWER FOOT AND DROP PRESSES.—Dies of every description made to order. Send for a circular N. C. STILES & CO.,
1 Vol. XIII. 52* West Meriden, Conn.

MILL-STONE DRESSING DIAMONDS SET IN Patent Protector and Guide.—Sold by JOHN DICKINSON, Patentee and Sole Manufacturer, and Importer of Diamonds for all mechanical purposes; also Manufacturer of Glaziers' Diamonds, No. 64 Nassau street, New York City. Old diamonds reset. N. B.—Send postage stamp for descriptive circular of the Dresser. 5 12*

THE FIRST AMERICAN-EUROPEAN PATENT CO. (Chartered), of Louisville, Ky., purchases, sells, negotiates, introduces Patents and Inventions throughout both the United States and Europe. Send for circulars or call at the
MAIN BRANCH OFFICE,
4 12* No. 49 Nassau street, New York.

WANTED—AGENTS.—$150 PER MONTH TO SELL the Improved New England Family Sewing Machine. Price $18. The simplest and best machine for family use in the world. Address DANE & CO., P. O. Box 52, Chicago, Ill., or call at Room No. 8, Post-office Block. 4 12

GREAT ECONOMY IN WATER POWER.—LEFFEL'S AMERICAN DOUBLE TURBINE WATER WHEEL, patented by James Leffel, of Springfield, Ohio, Jan. 14, 1862, and reissued Oct. 11, 1864.

The attention of all persons using water as a motor, and especially those with whom economy in water is desirable, is called to this wheel. When properly put in, this wheel is pledged at least to equal in efficiency the best overshot wheel in existence, or no sale. For circulars containing full description address the manufacturers,
4 9* JAS. LEFFEL & CO., Springfield, Ohio.

BOLTS, NUTS, WASHERS, COACH SCREWS, SET Screws, Etc., on hand, for sale by
4 12* LEACH BROTHERS, No. 86 Liberty street, N. Y.

WANTED TO PURCHASE—THE PATENT FOR THE best FILE-CUTTING MACHINE in the world. A liberal price will be paid, if we are satisfied that the machine presented is the one sought for. SWEET, BARNES & CO.,
4 5* Syracuse, N. Y.

STEAM AND WATER GAGES, BRASS AND IRON Cocks, Valves, Etc.; Wrought-iron, Brass and Galvanized Steam, Gas, and Water Pipe; Boiler Flues, Pipe-fitters' Tools, Ashcroft's and Packer's Ratchet Drills. JOHN ASHCROFT,
4 12* No. 50 John street, N. Y.

BUY THE BEST—SMITH'S GREEN MOUNTAIN Shingle Machine. Address
5 8* F. KRUM & CO., Box E, Albany, N. Y.

WHEELER & WILSON, 625 BROADWAY, N. Y.—Lock-stitch Sewing Machine and Button-hole Machine. 1tf

© 1866 SCIENTIFIC AMERICAN, INC.

GOVERNMENT SALE.—LARGE SALE OF FINE SURGICAL INSTRUMENTS.

Will be sold at Auction, at the Medical Purveyor's Warehouse, Public Square, Nashville, Tenn., on Tuesday, Feb. 13, 1866:

200 General Operating Cases;
25 Minor Operating Cases;
25 Exsecting and Trephining Cases;
55 Post-Mortem Cases, large;
100 Dissecting Cases;
200 Pocket Cases, two folds;
250 Pocket Cases, three folds;
150 Stomach Pumps, part flute-key valve;
350 Teeth-extracting instruments;
500 Davidson's Self-injecting Syringes;
1,000 Scarificators;
12,000 Cupping Glasses and Tins:
1,500 Trusses, single and double;
1,400 Scissors;
5,000 Tourniquets, all patterns;
1,500 Hard-rubber Syringes, assorted sizes;
800 sets Splints, all sizes;

Stethoscopes, Tongue Depressors, Syringes hypodermic, Etc., Obstetrical Cases, Speculums, Lancets, Etc., Etc.

☞ A portion of the foregoing articles are second hand, and will be sold separately. The balance is entirely new. The general operating cases contain instruments for amputations, exsections, minor operations, and sets of Catheters and Sounds.

AT SAME PLACE, ON WEDNESDAY, FEB. 14,
Will be sold a stock of
NEW BLANK BOOKS, STATIONERY, WRAPPING PAPER, AND 3,000 STANDARD MEDICAL BOOKS,
Consisting in part of

140 copies Gray's Anatomy;
50 do Dunglison's Medical Dictionary;
250 do Practice Medicine, Woods's, Bennet's, Watson's, Etc.;
50 do Dalton's Physiology;
50 do Virchow's Pathology;
130 do Surgery—Gross, Erichsen, Ferguson, Etc;
400 do U. S. Dispensatory;
60 do Beck's Jurisprudence;
50 do Parrish's Pharmacy;
40 do Therapeutics—Wood and Stille;
300 do Minor Surgery;
575 do Surgical Anatomy;
70 do Chemistry—Fownes;
20 do Webster's Dictionary, Etc., Etc., Etc.;
650 Blank Books, 4 quires cap, ½ bound;
1,000 do do small quarto;
325 do do fine, whole bound;
500 Reams Writing Paper—cap, letter, and note;
70 do Wrapping Paper, assorted;
1,000 Inkstands, various patterns;
200,000 Envelopes, assorted;
3,000 Blank Books, miscellaneous;
800 Portfolios;
Pencils, Pens, Ink, Etc., Etc.

☞ Some of the Medical Books are second hand, and will be sold separately. The books and instruments can be inspected the day before the sale. Catalogues may be had on application.

ROBERT FLETCHER,
Surgeon and Brevet Colonel U. S. Vols.,
6 3 Medical Purveyor U. S. A.

ATMOSPHERIC TRIP HAMMERS.

Persons intending to erect, or those using hammers, are invited to call and examine Hotchkiss's Patent Hammer, made by CHARLES MERRILL & SONS, No. 556 Grand street, New York. They are very simple in construction, require less power and repairs than any other hammer. The hammer moves in vertical slides; each blow is square and in the same place. For drawing or swaging they are unequaled, and many kinds of die work can be done quicker than with a drop. They are run with a belt, make but little noise, and can be used in any building without injuring the foundation or walls. The medium sizes, for working 2 to 4 inch square iron, occupy 28x56 inches floor room. Send for circular giving full particulars. 5 tf

M'CONNELL'S TUBE EXPANDER IS OFFERED to manufacturers of boilers, proprietors of steamers, and railroad managers, as the most superior tool produced for flue work, the saving of time and perfectness of operation being the prominent features. See illustration, Vol. XIV., No. 5, SCIENTIFIC AMERICAN. For information address ROBERT McCONNELL,
5 6 Box 401, Jacksonville, Ill.

OFFICE ENG'R AND SUP'T CHARLESTON AND SAVANNAH R. R., CHARLESTON, S. C., Jan. 6, 1866.

PERSONS INTERESTED IN MACHINES FOR Straightening Railroad Iron are requested to communnicate with the subscriber, inclosing description and cost of machine.
5 8 H. S. HAINES, Engineer and Superintendent.

TO ENGINEERS.—INCRUSTATION REMOVED AND PREVENTED.—Baird's Patent Incrustation Preventer and Remover, for Steam Boilers, in either Salt or Fresh Water. No invention connected with steam power combines so many advantages as this. The economy in fuel alone, from its use, repays the cost of the preventive.

JAS. F. LEVIN, No. 23 Central Wharf, Boston.
4 12 HAMPSON & COPELAND, No. 95 Maiden Lane, N. Y.

VALUABLE AMERICAN AND ENGLISH PATENTS manufactured and sold for cash on commission. Address KENYON & Co., No. 151 Broadway, N. Y. Kenyon & Co. are authorized to refer to us.—H. M. Wells, Director Broadway Bank, N. Y.; Jacob Miller, Director Citizens' Bank, N. Y 3 6*

THE WASHINGTON IRON WORKS HAVE ON HAND for sale their Improved Portable Steam Engines, Portable Circular Saw-mills, Gang Saw-mills, Flour and Corn Mills, and manufacture to order all kinds of Steam Engines, Marine, Stationary, and Propeller, Railroad Cars and Turn Tables, Iron Steam Vessels and Barges; also, General Machinery, Iron and Brass Castings, Large and Small Forgings, Etc. Address

GEO. M. CLAPP, Treasurer, Newburgh, N. Y.,
Or L. C. WARD, Agent,
No. 55 Liberty street, Room 8, New York. 1 19*

BOLT, SPIKE, AND RIVET MACHINES.—2,000 Bolts of any length, with head of any shape used in the trade, made from inch round or square iron, or under that size, are made per day of ten hours, by one man and boy, on Hardaway's Improved Patent Bolt Machine.

Our Spike Machine, for simplicity, durability, quality, and quantity of work turned out, is unequaled.

Our Rivet Machine is simple, durable, and does good work.

Shop and Territorial Rights for sale by Assignees of Hardaway & Sons. WHITE & BUTTERWORTH,
P. O. Box No. 292, Baltimore, Md.,
Office No. 2 Exchange Building.

"No. 951 BEACH ST., PHILADELPHIA, Oct. 20, 1865.

"We have this day sold our entire right and title to, and interest in, our improved patent Bolt Machine to Messrs. White & Butterworth, Baltimore, Md., to whom all letters of inquiry or orders should be addressed. They are also authorized to manufacture and sell our improved Spike and Rivet Machines. All orders to them will be promptly attended to. [2 tf] HARDAWAY & SONS."

MANUFACTURERS OF PLAIN AND ENGRAVED Hardened Cast-steel Rolls and Chilled Iron Rolls, of any form and size, for rolling Silver, Brass, Copper, Britannia Metal, Etc., with any thing desired in the way of engraving for figured or fancy work.
22 20* BLAKE & JOHNSON, Waterbury, Conn.

FOR PATENT SCROLL SAWS, PATENT POWER Mortising Machines, Tenoning, Boring and Doweling Machines, Sash, Blind and Door Machinery, of the latest and most improved description, address J. A. FAY & CO. Cincinnati, Ohio. 6dtf

WOOD-WORKING MACHINERY.—THE SUBSCRIBER is Agent in New York for J. A. Fay & Co., C. B. Rogers & Co., Ball & Williams, Richardson, Merlam & Co., H. B. Smith, Gray & Woods, Lane & Bodley, D. Doncaster, and all other manufacturers of Wood-working Machines. S. C. HILLS, No. 12 Platt st. d

CAN I OBTAIN A PATENT?—FOR ADVICE AND instructions address MUNN & CO., No. 37 Park Row, New York for TWENTY YEARS Attorneys for American and Foreign Patents Caveats and Patents quickly prepared. The SCIENTIFIC AMERICAN $3 a year. 50,000 Patent Cases have been prepared by M. & Co,

CIRCULAR SAW-MILLS—SINGLE AND DOUBLE—with heavy iron and wood frames, friction feed, and improved head blocks, with Steam Engines adapted to the Mill. Drawing given to set up by. Address, for full description,

ALBERTSON & DOUGLASS MACHINE CO.,
3 8* New London, Conn.

TAYLOR, BROTHERS & CO.'S BEST YORKSHIRE Iron.—This iron is of a superior quality for locomotive and gun parts, cotton and other machinery, and is capable of receiving the highest finish. A good assortment of bars and boiler plates in stock and for sale by JOHN B. TAFT, sole agent for the U. S. and Canadas, No. 18 Batterymarch street, Boston. 1 23*

PORTABLE ENGINES, SUITABLE FOR THE OIL Regions, from 8 to 20-horse power, with large fire place, independent steam feed pump, steam gage, and improved water heater. The most complete and best engines in the market. For particulars address WM. D. ANDREWS & BRO.,
1 tf No. 414 Water street, N. Y.

M. H. TILDEN. C. W. MOULTON.

TILDEN & MOULTON, ATTORNEYS AT LAW, Office No. 17½ West Third street, Selves Building, Cincinnati, Ohio. 3 12*

HOLSKE & KNEELAND, MODEL MAKERS. PATENT Office Models, Working Models and Experimental Machinery, made to order at 528 Water street, near Jefferson street, New York. Refer to Munn & Co., SCIENTIFIC AMERICAN Office. 1tf

FOR WOODWORTH PATENT PLANING AND MATCHING MACHINES, Patent Siding and Resawing Machines address J. A. FAY & CO., Cincinnati, Ohio. 3 1y

MACHINERY AND TOOLS OF ALL KINDS AT lowest prices. BARAGWANATH & VAN WISKER,
European and American Tool Agents, 200 Broadway, N. Y.
Branch offices—London, Paris, and Melbourne. 6 tf

FOR SALE—UPWARDS OF TWENTY VALUABLE Patents. Particulars in our Illustrated Catalogue.
BARAGWANATH & VAN WISKER, 200 Broadway, N. Y.
Branch offices—London, Paris and Melbourne. 6 tf

ANDREWS' PATENT OSCILLATING ENGINES.—Double and Single Engines, from ½ to 125-horse power, finished at short notice. These engines leave the shop ready for use; require no special foundation; are compact, light and simple, and economical of power. For descriptive pamphlets and price list address the manufacturers, W. D. ANDREWS & BRO.,
1 tf No. 414 Water street, N. Y.

GROVER & BAKER'S HIGHEST PREMIUM ELASTIC Stitch Sewing Machines, 495 Broadway, New York 1 tf

SETS, VOLUMES AND NUMBERS.

Entire sets, volumes and numbers of SCIENTIFIC AMERICAN Old and New Series) can be supplied by addressing A. B. C., Box No 773, care of MUNN & CO., New York. 5 tf

JUST PUBLISHED—THE INVENTORS' AND MECHANICS' GUIDE.—A new book upon Mechanics, Patents and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 112 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents; Hints upon the Value of Patents; How to Sell Patents; Forms for Assignments; Information upon the Rights of Inventors, Assignees and Joint Owners; Instructions as to Interferences, Reissues, Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 108 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO., No. 37 Park Row, N. Y. 14 tf

M. BAILEY & CO., PROVISION BROKERS, NO. 40 West Fourth street, Cincinnati. Orders for Provisions, Lard, Tallow, Grease, Oils, etc., carefully and promptly filled.
XIII 16 44*

EMERY PAPER AND CLOTH, AND FLINT SAND Paper, all grades and lengths.

Ground Emery and Ground Flint or Quartz, all sizes; Glue for all purposes; Curled Hair; Plastering Hair; Stuffing Hair; Rawhide Whips; Rawhide Cord or Rope; Rawhide cut to any size; Bones and Bonedust; Neat's Foot Oil—for sale by the manufacturers.

BAEDER & ADAMSON,
23 13* Stores { No. 67 Beekman street, New York, and No. 730 Market street, Philadelphia.

J. A. FAY & CO.,
CINCINNATI, OHIO,
Patentees and Manufacturers of all kinds of
PATENT WOOD-WORKING MACHINERY
of the latest and most approved description,
particularly designed for

Navy Yards, Sash, Blind and Door,
Ship Yards, Wheel, Felly and Spoke,
Railroad, Stave and Barrel,
Car and Shingle and Lath,
Agricultural Shops, Planing and Resawing,
Mills, Etc.

Warranted superior to any in use. Send for Circulars.
For further particulars address J. A. FAY & CO.,
Corner John and Front streets,
Cincinnati, Ohio,
Who are the only manufacturers of J. A. Fay & Co.'s Patent Wood working Machinery in the United States. 3 1y

OIL! OIL! OIL

For Railroads, Steamers, and for machinery and Burning, PEASE'S Improved Engine Signal, and Car Oils, indorsed and recommended by the highest authority in the United States and Europe. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The "Scientific American," after several tests, pronounces it "superior to any other they have used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No 61 and 63 Main street, Buffalo, N. Y.

N. B.—Reliable orders filled for any part of the world. 1tf

PORTABLE STEAM ENGINES—COMBINING THE maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 300 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address J. C. HOADLEY & CO., Lawrence, Mass. 1 tf

$1,500 PER YEAR!—WE WANT AGENTS every where to sell our improved $20 Sewing Machines. Three new kinds. Under and upper feed. Warranted five years. Above salary, or large commissions, paid. The only machines sold in United States for less than $40, which are fully licensed by Howe, Wheeler & Wilson, Grover & Baker, Singer & Co., and Bachelder. All other cheap machines are infringements. Circulars free. Address, or call upon Shaw & Clark, Biddeford, Maine. 25 15*

GODDARD'S BURRING MACHINE WORKS,
Office, No. 3 Bowling Green, New York,
manufacture the
Patent Steel Ring and Solid Packing
BURRING MACHINES,
Patent Mestizo Wool-burring Pickers, Shake Willows, Wool and Waste Dusters, Gessner's Patent Gigs, Etc.

Orders respectfully solicited, and prompt attention given, by addressing C. L. GODDARD,
23 13* No. 3 Bowling Green, N. Y.

AMESSIEURS LES INVENTEURS.—AVIS IMPORTANT Les inventeurs non familiers avec la langue Anglaise, et qui préféreraient nous communiquer leurs inventions en Français peuvent nous addresser dans leurl angue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence. MUNN & CO.,
Scientific American office, No. 37 Park Row New York.

THE MOST VALUABLE MACHINE FOR BUILDERS and Carpenters, Furniture, Carriage, Agricultural Implement, Sash and Door, Waived and Straight, Molding and Piano Manufacturers, complete for all kinds of irregular and straight work in wood, hard or soft, superior to all others, having the capacity of 20 good mechanics, called the Variety Molding and Planing Machine. We own 9 patents, covering the valuable inventions for machines with upright mandrels. Have them manufactured in one place only for the United States and Europe, viz.: at Plass Iron Works, No. 110 East Twenty-ninth street, New York. We hear there are parties manufacturing machines infringing on some one or more of our patents. We caution the public from purchasing such infringements. Our patents secure to us the machine with either iron or wooden table, through which are two upright mandrels, having cutters in each head held by a screw nut; also, combination collars, saving 75 per cent in cutters, feed table to plane and cut, irons outside the cutters, preventing wood from taking undue hold. Also guards acting as plane stocks, making it safe for a boy to run.

Agents solicited. Please send for circular giving full description.

Information or orders for machine may be addressed COMBINATION MOLDING AND PLANING MACHINE COMPANY, New York City. 1 9*

BUERK'S WATCHMAN'S TIME DETECTOR.—IMPORTANT for all large corporations and manufacturing concerns—capable of controlling with the utmost accuracy the motions of a watchman or patrolman, as the same reaches different stations of his beat. Send for a circular.

J. E. BUERK,
23 26* P. O. 1,057, Boston, Mass

CIRCULAR SAW-MILLS.—THE UNDERSIGNED are now manufacturing Circular Saw-mills of all sizes, with solid iron or heavy wood frame, suitable for the Southern market. Also, Sugar Mills, vertical or horizontal; Steam Engines and Boilers, stationary or portable; Brick Machinery; Mill Gearing, and Iron and Brass Castings of every description.

For particulars address CORWIN, STANTON & CO.,
24 12* Newburgh Steam Engine Works, Newburgh, N. Y.

THE HARRISON BOILER—A SAFE STEAM BOILER. —Attention is called to this Steam Generator, as combining essential advantages in Absolute Safety from explosion, first cost and cost of repairs, economy of fuel, facility of cleaning, transportation, etc., not possessed by any boiler in use.

This Boiler is a combination of cast-iron hollow spheres. Its form is the strongest possible, unweakened by punching or riveting. Every boiler is tested by hydraulic pressure at 400 pounds to the square inch. It Cannot be Burst Under Any Practicable Steam Pressure. It is not affected by corrosion, which so soon destroys wrought-iron boilers. It has economy in fuel equal to the very best, arising from the large extent of surface exposed to the direct action of the fire. It produces superheated steam, and is not liable to priming or foaming. It is easily transported, can be erected by ordinary workmen, is readily cleaned inside and out, and requires no special skill in its management. Under ordinary circumstances, it is kept free from permanent deposit by blowing the water entirely out, under pressure, once a week. A boiler can be increased in size to any extent by adding to its width. It has less weight, and takes less than half the area of ordinary boilers, without increase in hight. Drawings and Specifications furnished free. For descriptive circulars and price address JOSEPH HARRISON, JR.,
Harrison Boiler Works, Gray's Ferry Road,
1 8* Near U. S. Arsenal, Philadelphia.

FOR DANIELLS'S PLANING MACHINES, CAR MORTISING, Boring Machines, Car-Tenoning Machines, Car Planing and Beading Machines, Etc., address J. A. FAY & CO., Cincinnati Ohio 3 1y

IRON PLANERS, ENGINE LATHES, DRILLS AND other machinists' tools, of superior quality, on hand and finishing, for sale low. For description and price address NEW HAVEN MANUFACTURING COMPANY New Haven, Conn. 1tf

ANDREWS' PATENT CENTRIFUGAL PUMPS—CAPACITY from 90 to 40,000 gallons per minute. For draining and irrigating lands, wrecking, coffer dams, condensers, cotton, wool and starch factories, paper mills, tanneries, and all places where a large and constant supply of water is required, these pumps are unequaled. They are compact, require little power, and are not liable to get out of order. For descriptive pamphlet address

1 tf W. D. ANDREWS & BRO., No. 414 Water street, N. Y.

DAMPER REGULATORS—GUARANTEED TO EFFECT a great saving in fuel, and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms or flexible vessels of any kind. CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, No. 117 Broadway, New York, XIII 10 26*

FOR SALE—ENGINES, BOILERS, AND STEAM PUMPS, both new and second-hand, at 167 to 175 Water street, Brooklyn. FINNEY & HOFFMAN, Dealers in Machinery 1 10*

VALUABLE ROLLING MILLS FOR SALE—SITUATED on the west side of Second avenue, between Forty sixth and Forty-seventh streets, comprising two Trains of Rolls, three Steam Engines and Boilers, Heating Furnaces, and all the Machinery necessary for carrying on a large and profitable business in the manufacture of iron or steel. These works have lately been put in thorough working order, and are ready to start at once.

Also, connected with the above, a Crucible Manufactory.

For further information apply to SAML. MULLIKEN & CO.,
26 tf Agents, No. 159 Front street, New York.

SALE OF CONDEMNED ORDNANCE STORES

Will be sold at Public Auction, at Indianapolis Arsenal, Indianapolis, Indiana, on the 20th day of February, 1866, at 10 o'clock A. M., a large quantity of Ordnance Stores of inferior quality, consisting in part of the following articles, viz:—

974 Carbines, various kinds.
36,000 Muskets and Rifles, new and old, United States and foreign, of various calibers.
503 Starr's Army Revolvers, serviceable.
276 Savage's Navy Revolvers, new and others; with a large lot of Spare Parts for the repair of small arms of various patterns.
430 Cavalry Saber Belts, worn.
724 Cavalry Saddles, worn.
,090 Cavalry Bridles, worn.
288 Belt Holsters for Pistols, worn.
200 Cartridge boxes for Pistols, worn.
153 Cartridge Boxes for Carbines, worn.
300 Slings for Carbines, worn
158 sets of Artillery Harness, worn.
4,000 sets of Infantry Accouterments, worn.

Also a large lot of Appendages for the various kinds of Muskets and Rifles.

Samples to be seen at the Indianapolis Arsenal, and at the United States Ordance Agency, No. 45 Worth street, New York City

Terms of Sale—CASH. JAS. N. WHITTEMORE,
4 6 Capt. and Brevet Maj. Ord., Commanding

Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an

Munn & Co.,
37 Park Row, New-York.

Auf der Office wird deutsch gesprochen.

Daselbst ist zu haben:

Die Patent-Gesetze der Vereinigten Staaten,

nebst den Regeln und der Geschäftsordnung der Patent-Office und Anleitungen für den Erfinder, um sich Patente zu sichern, in den Ver. Staaten sowohl als in Europa. Ferner Auszüge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Rathschläge; ebenfalls nützliche Winke für Erfinder und solche, welche patentiren wollen.

Preis 20 Cts., per Post 25 Cts.

© 1866 SCIENTIFIC AMERICAN, INC.

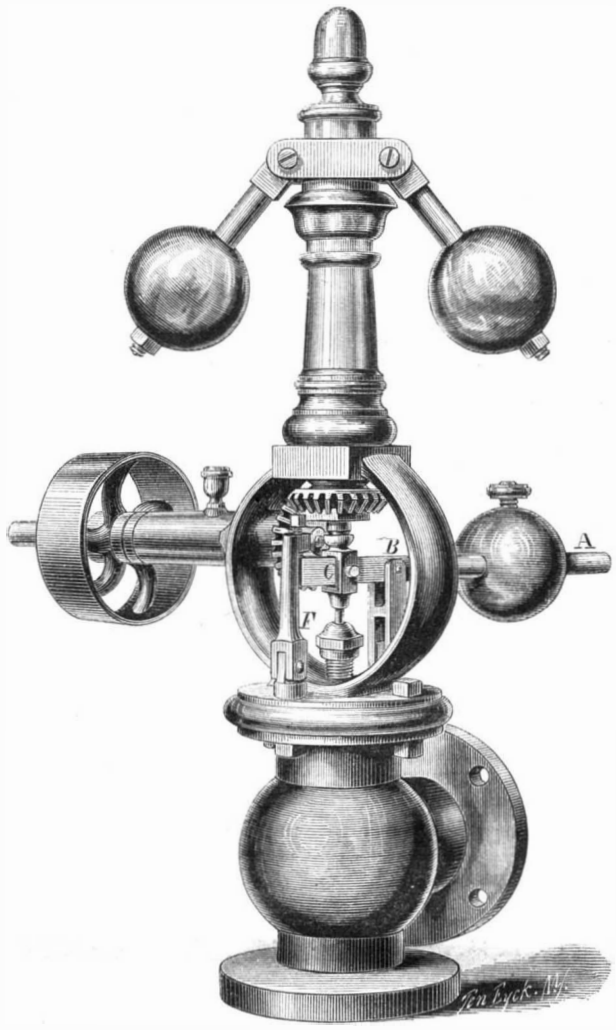
Automatic Stop Governor.

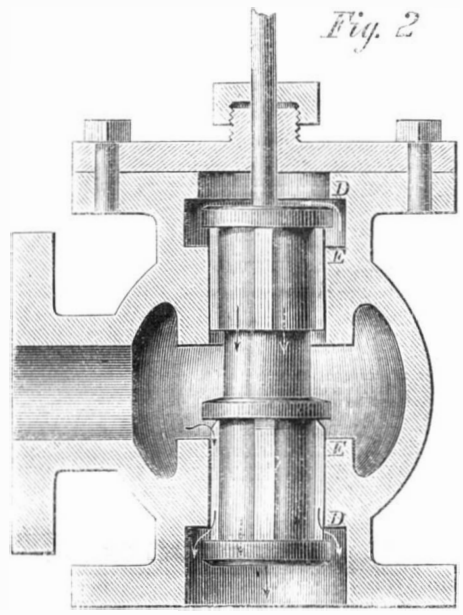
The best steam engine that can be constructed, as regards proportion, design, and workmanship, runs very defectively unless it has a good governor. Where the load on it constantly varies, the speed will be at one time high, or at another low, if some measures are not taken to regulate the quantity of steam admitted to the cylinder.

In these engravings we illustrate a new self-acting governor which not only regulates the flow of steam to the cylinder, but also serves as a stop-motion in case of emergency when the engineer is not close to the throttle valve. The ends are obtained by the construction of the valve, and the mechanism which operates it.

By referring to the engraving in Fig. 1, a weighted lever, A, may be seen. This lever has its fulcrum at B, and connects with the throttle valve stem by a square socket, C, in which it is free to move up or down. This weighted lever is provided to take up the lost motion, in the joints and pins of the governor arms, and to partially balance the valve, thus rendering it easy to move, and very sensitive to the action of the arms, so that any change in the load of the engine, whether an increase or decrease, is instantly felt at the throttle valve, and more or less steam admitted, as may be required. The balls tend to depress the valve, while the weighted lever tends to raise it, so that as the velocity of the arms changes, the valve always follows them, and therefore acts instantly as before stated.

Fig. 2 shows the valve. This valve is a hollow cylinder, A, with four guiding wings, B, and three seats acting on four seats in the chamber, C. It is thus made for these reasons—being hollow and having clearance between the seats (as given by the guiding wings), it is balanced so soon as it is slightly raised from the seat, for the steam presses both on the inside and outside of it. So long as the engine runs regularly, or at a uniform velocity, the valve floats in steam, and plays between the seats, D D and E E. If a belt breaks, however, or it is desired to stop the engine from any part of the building, a wire or line, led from any room, communicates with the weighted lever and raises the valve, so that its seats close the openings at D, and shuts off the steam from the engine, thereby stopping it at once.





GARDNER & ROBERTSON'S AUTOMATIC STOP GOVERNOR.

The weighted lever also furnishes a medium for regulating the speed of the engine.

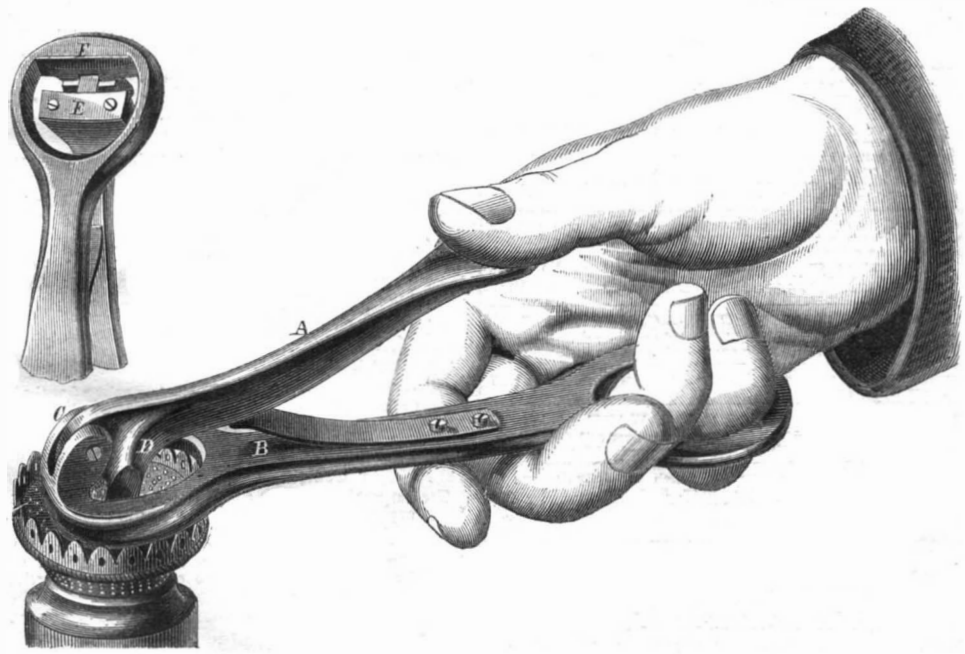
This valve and governor is the subject of three patents, all secured through the Scientific American Patent Agency, the last one bearing date November 21, 1865.

The inventors and manufacturers are Messrs. Gardner & Robertson, of Quincy, Ill. For further information address them at that place.

Kerosene Lamp Trimmer.

All persons who use kerosene lamps know that it is a difficult matter to trim the wicks properly, without some experience, and that in any event the top of the wick is likely to be jagged and not of the proper shape, unless the person cutting has considerable manual dexterity. Moreover, the wick is so thick that common scissors (which are always dull) slip over it without producing any effect. To obviate these troubles, the instrument shown herewith has been devised. It has great power, combined with unerring uniformity in the shape of the cut, so that any unskilled person can trim the lamp properly. The instrument consists of a lever, A, fastened to a frame, B, by a joint, C. The lever has a jaw at D, which is armed with a cutter, E, as in Fig. 2, where the parts are shown bottom up, to exhibit them to better advantage. It is easy to see that when the lever is pressed by the hand, as illustrated in the engraving, the parts will be brought together; the cutter will be forced up against the wick, held between it and the back part of the frame (as at F), and so cut off exactly the right shape; the cutter being slightly rounded to secure that desideratum.

The instrument can be applied to any lamp, and, as may be seen will work to great advantage. A patent was allowed through the Scientific American Patent Agency last November. For further information address W. R. Brooks, Boston, Mass.



BROOKS'S KEROSENE LAMP TRIMMER.

The standard, F, in Fig. 1, has a set screw in the top which regulates the amount of opening or the degree to which the valve closes, so that the engine may be wholly stopped or slowed down to any degree. The

MECHANICS

INVENTORS, MANUFACTURERS

The SCIENTIFIC AMERICAN is the largest and most widely circulated journal of its class in this country. Each number contains sixteen pages, with numerous illustrations. The numbers for a year make two volumes of 416 pages each. It also contains a full account of all the principal inventions and discoveries of the day. Also, valuable illustrated articles upon Tools and Machinery used in Workshops, Manufactories, Steam and Mechanical Engineering, Woolen, Cotton, Chemical, Petroleum, and all other manufacturing and producing interests. Also, Fire-arms, War Implements, Ordnance, War Vessels, Railway Machinery, Electric, Chemical, and Mathematical Apparatus, Wood and Lumber Machinery, Hydraulics, Oil and Water Pumps, Water Wheels, Etc.; Household, Horticultural, and Farm Implements—this latter department being very full and of great value to Farmers and Gardeners. Articles embracing every department of Popular Science, which every body can understand and which every body likes to read.

Also, Reports of Scientific Societies, at home and abroad, Patent-law Decisions and Discussions, Practical Recipes, Etc. It also contains an Official List of all the Patent Claims, a special feature of great value to Inventors and owners of Patents.

Published Weekly, two volumes each year, commencing January and July.

TERMS.

Per annum.....$3 00
Six months..... 1 50
Ten Copies for One Year.....25 00

Canada subscriptions, 25 cents extra. Specimen copies sent free, Address

MUNN & CO., Publishers,
No. 37 Park Row, New York City

Messrs. MUNN & CO. have had twenty years' experience in procuring Patents for New Inventions. Inventors who may have such business to transact can receive, free, all needful advice how to proceed.

FROM THE STEAM PRESS OF JOHN A. GRAY AND GREEN

© 1866 SCIENTIFIC AMERICAN, INC.